

THEOPHRASTUS OF ERESUS
SOURCES FOR HIS LIFE, WRITINGS
THOUGHT AND INFLUENCE

COMMENTARY VOLUME 5
SOURCES ON BIOLOGY

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R.W. SHARPLES

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SOURCES ON BIOLOGY

(Human Physiology, Living Creatures,
Botany: Texts 328-435)

BY

R.W. SHARPLES



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INTRODUCTION

This is the first to appear of a projected nine volumes of commentary by various authors, each relating to a different part of the collection of texts relating to Theophrastus compiled and edited under the leadership of W.W. Fortenbaugh and published in 1992 (*Theophrastus of Eresus: Sources for his Life, Writings, Thought and Influence*, edited and translated by William W. Fortenbaugh, Pamela M. Huby, Robert W. Sharples (Greek and Latin) and Dimitri Gutas (Arabic), together with five others: 2 vols., Leiden, Brill, 1992. Cited as FHSG). The present volume of commentary, no. 5 in the eventual series, covers texts **328-435** in the second volume of that collection, relating to human physiology, zoology and botany. The collection of texts was arranged by subject matter rather than by the known or conjectured relation of testimonia to particular Theophrastean works (cf. the Introduction to the collection of texts, vol. 1 pp. 7-8), and the arrangement of topics was broadly that familiar from the ordering of Aristotle's writings in Bekker's edition. The subject matter of the present commentary might thus be loosely described as the Theophrastean counterpart to the Bekker pages of Aristotle 436-789 (i.e. starting with the *Parva Naturalia*; Theophrastus' writings on general psychology will be dealt with in volume 4 of the commentary).

It should be emphasised at the outset that our collection of texts is confined, with a very few exceptions, to those passages where Theophrastus is actually named, and that it is explicitly concerned with material that does not survive in Theophrastean works transmitted in MSS. We are concerned, in other words, with reports of Theophrastus' views, sometimes quotations but more often paraphrases, in other authors. It is not therefore the task of this commentary to deal with the *Research on Plants* (*Historia plantarum*) as a whole, or to discuss every passage in a later author where the influence of Theophrastus can be detected though he is not named. To tell the whole story of Theophrastus' influence would be the task of a full-scale history of ancient science; to do so in relation to the *Research on Plants* alone would require a full-scale commentary on Dioscorides, along with much else. The task of the present volume, and of others in the series, is the more restricted one of providing commentary on the texts we have printed, though to do so while providing a sufficient

glimpse of the whole picture at least to put them in context.

Our policy throughout the collection has been to take some account of *every* reference to Theophrastus by name in any source before the cut-off date of 1450 A.D. Many of the medieval references, including some discussed in the present volume, are of extremely dubious value; but so are some of the ancient ones as well.¹ As an aid to the reader certain reports have been flagged in their headings in the Commentary as “spurious”, “dubious” or “inaccurate”; “spurious” when the process by which the content came to be misattributed to Theophrastus can be reconstructed, “inaccurate” when a report can be shown to be a distortion or a free paraphrase of an extant work. However, just as “inaccurate” covers the whole range from misunderstanding to a type of compression in summarising which is hardly reprehensible, so “dubious” covers many degrees of uncertainty; the reader should consult the detailed discussion of the passage in each case. There are moreover many cases where, while there is no particular reason to doubt the truth of what a report says about Theophrastus, its historical value seems very limited, either because the information it gives is so general or because Theophrastus is simply listed among a number of individuals all said to hold standard Peripatetic doctrines. Such cases have not been flagged in their headings, for in so far as what they say about Theophrastus is true they are not potentially *misleading*; for the question of their value the reader is referred to the detailed discussion.

The state of the sources and of our knowledge is not the same in the different areas covered by the present volume. In botany

¹ One work which is occasionally cited in the commentary, but not in the volume of texts because of its late date, is Erasmus' *Parabolae*. This contains a lengthy section of observations from natural history headed “from Aristotle, Pliny, Theophrastus” (230.122-326.64 Margolin [1975]; see Bibliography). Erasmus does not himself indicate the provenance of the individual items. In fact most of them, including some which ultimately derive from lost works by Theophrastus, were clearly taken by Erasmus from Pliny. Some however occur both in the surviving works of Theophrastus and in the pseudo-Aristotle *Problems* (Erasmus *Parabolae* 316.545 = Theophrastus, *On Tiredness* 13 = [Aristotle] *Problems* 5.8; Erasmus 316.547 = Theophrastus, *On Tiredness* 14 = [Aristotle] *Problems* 5.10, 5.23). Given that there are other passages that correspond to pseudo-Aristotle but not to Theophrastus (Erasmus *Parabolae* 316.562 = [Aristotle] *Problems* 12.5, 13.2; Erasmus, *Parabolae* 316.565 = [Aristotle] *Problems* 13.12. Erasmus *Parabolae* 318.572, too, is closer in wording to [Aristotle] *Problems* 13.9 than to Theophrastus *On Sweating* 10 or [Aristotle] *Problems* 2.13 and 20.33, which it also resembles) and that the reference to Theophrastus was only added by Erasmus in the fourth edition of the work, it seems possible that he originally took these items from the pseudo-Aristotle *Problems*, but then realised that they occurred in Theophrastus too and added the name of the latter.

Theophrastus' works survive, and the task is to understand the relation to them of references in other ancient sources that do not always correspond to the texts we now have. In zoology we have a few summaries of short treatises and one, *On Fish*, preserved in MSS, but generally it is a matter of piecing together Theophrastus' discussions from later evidence, and trying if possible to recover something of the original theoretical preoccupations. Where human physiology is concerned the situation is intermediate between these two extremes; we have some surviving works and some second-hand reports. Since our collection is arranged by topics, rather than by the Theophrastean works to which reports can with more or less certainty be connected, it is a duty of the commentary volumes to suggest such connections where possible; in the present volume this is frequently possible in zoology and to some extent in physiology, but is rendered less appropriate in the case of some of the reports on the latter by their very general nature. Even in the context of zoology, while it might be expected that the feasibility of assigning a report to a particular Theophrastean work would be a useful consideration in judging its reliability, in practice our lack of knowledge of the content of some of the zoological works whose titles are reported to us makes such a criterion less useful than might at first be thought.

The disparate state of our evidence for the topics covered in this volume means that a general introduction is not the place for extended discussion of methodology. Such issues will be dealt with in the separate introduction to each section. However, it may not be out of place at least to mention certain points, which are not relevant to the present volume alone but affect the study of Theophrastus generally. First, there is the danger of false perspectives in our assessment of the relation of Theophrastus to his senior colleague Aristotle. Our text **72A** could be used to argue for a Theophrastus whose writings and thought followed Aristotle closely in their general structure; but Boethius in **72A** may be speaking of the particular field of logic, and in that very field some of the modifications that Theophrastus made within a general framework taken over from Aristotle were far from insignificant. A sound assessment of Theophrastus' relation to Aristotle is made the more difficult by the tendency of our sources either to couple the two together as the chief representatives of the Peripatetic school, or to emphasise differences between them just because a general agreement is assumed. Moreover, the extent to which we judge Theophrastus to have diverged from Aristotle will depend not a little on our own judgement

of Aristotle's views and of what is really important in them. This is an issue that affects our interpretation of many areas of Theophrastus' activity, and which will be discussed in individual volumes of the Commentary.

Two other problems, which will be discussed at greater length in the introductions to the sections on Zoology and on Botany in the present volume, may be mentioned here. One is the uncertainty, already in antiquity, as to whether certain works were by Theophrastus or by Aristotle; the other is the tendency of later ancient authors to work from compendia, which combined material from a number of different sources, rather than from the original works even of authors whom they cite by name. The scope for error and misunderstanding in citations in such circumstances is considerable; indeed, the oddities of the citations in a medieval compilation such as the *Lumen Animae* (see on **342-4**) may be seen as just an extreme case of the process.²

Given the different situation in various parts of the material here studied, and the differences in scale of the texts commented on, it has not seemed desirable to impose a rigid structure on the discussion of each text. In every case, however, discussion of an individual text begins with an indication of modern literature, if any, relevant to it. The following discussion deals with some or all of the following heads: context; sources; doctrine. But not all appear in every case, and the sequence in which they are treated may vary, since in this sort of study the relation between doctrinal questions and those relating to the transmission of information or the correct reading of a text may go in either direction. For some of the longer texts a line-by-line style of commentary has been adopted; in every case, the nature of the material has been the guide. General discussion of each topic and each group of texts precedes discussion of individual texts, and cross-reference within the commentary is on this basis (so that, for example, "on **355-8**" or "on **359A-C**" refers to the general introduction to those groups of texts, "on **358**" or "on **359A**" to specific discussions within those groupings). For references to modern

² The existence of confusion in antiquity between Aristotelian and Theophrastean material explains why Rose (1863) and (1886) chose to include some of our passages in his collections of *Aristotelian* fragments—particularly since he also held the idiosyncratic belief that all the citations of Aristotle himself by name in later ancient authors were spurious in any case. Reference is made for Aristotle fragments cited in this commentary both to Rose and to Ross where applicable; but many of Rose's "Aristotle" fragments do not appear in Ross.

works by author's name only the reader should consult first the listing of literature at the start of the discussion of each text, and then the general bibliography at the end of the present volume. General abbreviations are listed at the end of this preface.

This commentary is designed to be used in conjunction with the volume of texts and translations; this includes both an apparatus of parallels for each text and an apparatus of textual variations and emendations, and information given in these has only been repeated in the Commentary where relevant to the discussion there. In the text and translation volume isolated Greek words (such as the lemmata of ancient lexica) appear in the English translation in transliterated form, and the titles of ancient works are translated into English on the right-hand page. To print all Greek words in the Commentary in Greek script, or to use Latin rather than English titles for ancient works, would make the commentary less accessible to those who do not have Greek than the volume it is commenting on (quite apart from the arbitrariness of giving Latin titles to works originally written in Greek). Isolated words or phrases of Greek have therefore been given in transliteration, with longer passages where textual matters are being discussed being given in Greek script. Complete consistency in this has doubtlessly not been achieved, but consistency can be an over-rated virtue. The titles of ancient works have generally been given in the same English versions as used in the text and translation volume, with one or two exceptions; some works cited very frequently have been abbreviated, as listed below (for example, Theophrastus *HP* and Aristotle *HA*).³ The pseudo-Aristotle *De mirabilibus auscultationibus* is frequently referred to, not surprisingly as about half of the contents of the work derive from Theophrastus; both the Latin title and the English *On Marvellous Things Heard* are somewhat cumbersome, and I have therefore used *Mirabilia*, simply, to refer to this pseudo-Aristotle work throughout. The names of other authors of paradoxographical works are always given.

The preface to the collection of texts and translations includes acknowledgements to many organisations and individuals who have helped us all. Here I wish to express personal thanks to the British Academy and to those individuals whose assistance and readiness to

³ The use of an abbreviation for the latter incidentally helping with two difficulties: the fact that *History of Animals* is so familiar as a title that one could hardly use anything else, inaccurate as an English rendering though the title is, and the problem of whether or not to cite *HA* 8 and 9 as by Aristotle.

discuss the most abstruse topics is reflected in one way or another in the present volume of commentary: Suzanne Amigues, Charles Burnett, Victor Caston, Walter Cockle, Andrew Dalby, Giovanbattista D'Alessio, Phillip De Lacy, Mervin Dilts, Pat Easterling, Bill Fortenbaugh, Allan Gottself, Hans Gottschalk, Alan Griffiths, Dimitri Gutas (who has contributed the commentary on **433**), Eva Henze, Pamela Huby, Robert Ireland, Peter Kingsley, Jim Lennox, Geoffrey Lloyd, Colin Mills, David Mirhady, David Minter, Alex Mourelatos, Moshe Negbi, Vivian Nutton, Dirk Obbink, the late Walter Pagel, Tony Preus, Michael Reeve, Robert Renehan, David Sedley, Yegane Shayegan, Michael Sollenberger, Richard Sorabji, Robert Temple, K. Tsantsanoglou, Marlein van Raalte, Malcolm Willcock. I am particularly grateful to Suzanne Amigues and Michael Sollenberger for allowing me to refer to work of theirs not yet published, and to Bill Fortenbaugh, Alan Griffiths, Pamela Huby, Vivian Nutton, Pierre Pellegrin and David Runia for reading through drafts of this commentary. Where no bibliographical reference is given for a suggestion by any of these, it was made in a private written or oral communication; the responsibility for any errors in the use I have made of the advice of others remains, of course, my own. I am also most grateful to the staff of the libraries of the Institute of Classical Studies and of the Warburg Institute, both in London, and of my own college. Much use has been made in working on this commentary of the successive CD-ROM disks produced by the *Thesaurus Linguae Graecae*, which enable an individual scholar to have in a minute space and at very small cost the sort of reference library of ancient texts of which many in the past could only have dreamed. My grateful thanks are also due, as ever, to my wife Grace and daughter Elizabeth.

Study of these matters has made me acutely aware of my lack of qualifications for writing this commentary. I have no training in physiology, zoology or botany; and the fact that many of those who have transmitted Theophrastus' views to us did not do so either is hardly a justification. Indeed I am all too conscious of the applicability to myself of what Valentin Rose said of the compiler of the pseudo-Aristotle *Zôika*: *non sicut philosophus sed ut philologus i.e. qui rei ipsius imperitus esset*.

R.W. Sharples
University College London
May 1994

ABBREVIATIONS

- Bonitz : H. Bonitz, *Index Aristotelicus* (*Aristotelis Opera*, ed. I. Bekker, rev. O. Gigon, vol. 5), Berlin: De Gruyter, 1961.
- BT : Bibliotheca Teubneriana (Leipzig: B.G. Teubner).
- CB : Collection des Universités de France, publiée sous le patronage de l'Association Guillaume Budé (Paris: Les Belles Lettres).
- CAG : *Commentaria in Aristotelem Graeca*, Berlin: Reimer, 1882-1909
- CMG : *Corpus Medicorum Graecorum*, Leipzig: Academia Berolinensis, etc., 1908-.
- FHSG : see Introduction, p. ix.
- FVS : H. Diels and W. Kranz, *Fragmente der Vorsokratiker*, 6th ed., Zurich: Weidmann, 1951-2.
- LCL : Loeb Classical Library. (Cambridge, Mass.: Harvard University Press).
- LSJ : H.G. Liddell and R. Scott, rev. H.S. Jones, *A Greek-English Lexicon*, ninth edition, Oxford: Clarendon Press, 1940.
- OCD : N.G.L. Hammond and H.H. Scullard, eds., *The Oxford Classical Dictionary*, second edition, Oxford: Clarendon Press, 1970.
- PG : *Patrologia Graeca*, ed. J.-P. Migne, Paris, 1857-1904.
- PL : *Patrologia Latina*, ed. J.-P. Migne, Paris, 1844-1904.
- Paroem. Gr. : E.L. von Leutsch and F.G. Schneidewin, *Corpus Paroemiographorum Graecorum*, Göttingen: Vandenhoeck and Ruprecht, 1839, repr. Hildesheim: Georg Olms, 1958.
- Pack : R.A. Pack, *The Greek and Latin Literary Texts from Greco-Roman Egypt*, 2nd ed., Ann Arbor: University of Michigan Press, 1967.
- Parad. Gr. = A. Giannini, *Paradoxographorum Graecorum Reliquiae*, Milan: Istituto Editoriale Italiano, 1966.
- PRLE : A.H.M. Jones, J.R. Martindale and J. Morris, *The Prosopography of the Later Roman Empire*, vol. 1, Cambridge: Cambridge University Press, 1971.
- RE : *Paulys Real-Encyclopädie der Altertumswissenschaft*, ed. K. Wissowa, Stuttgart: Metzler/Munich: Druckmüller, 1894-1978 (with supplements).
- Rose³ : Rose, V. *Aristotelis Fragmenta*. Leipzig, Teubner, 1886.
- spp. = species (plural)
- Suppl. Arist. = *Supplementum Aristotelicum*, Berlin: Reimer, 1885-1903.
- SVF : H. von Arnim, ed., *Stoicorum Veterum Fragmenta*, Leipzig: Teubner, 1903-24.

Wehrli : Wehrli, F., *Die Schule des Aristoteles*, vols. 1-10 and supplements 1-2, second edition, Basel: Schwabe, 1967-78.

The following ancient works are cited by author's name or title only:

Aelian = Aelian, *On the Nature of Animals*

Antigonus = Antigonus, *Collection of Amazing Stories*

Apollonius = Apollonius, *Amazing Stories*

Athenaeus = Athenaeus, *The Sophists at Dinner*

CP = Theophrastus, *Plant Explanations (De causis plantarum)*

GA = Aristotle, *Generation of Animals*

HA = Aristotle, *History of Animals (Historia animalium)*

HP = Theophrastus, *Research on Plants (Historia plantarum)*

MA = Aristotle, *Motion of Animals*

Mirabilia = [Aristotle], *On Marvellous Things Heard*

PA = Aristotle, *Parts of Animals*

Pliny = Pliny the Elder, *Natural History*

HUMAN PHYSIOLOGY

328-349 Regenbogen (1940) 1402-5. Wehrli (1983) 506.

OVERVIEW: SOURCES AND DOCTRINES

The texts grouped together in this section are concerned, in modern terms, with the functioning of the human body rather than with the soul. That is not a way of putting the matter that either Aristotle or Theophrastus would have recognised; in Peripatetic terms the material collected here is either concerned with details of the functioning of the faculties of soul (and so corresponds to Aristotle's *Parva Naturalia*) or else is part of zoology, the study of living creatures, picked out from the subject as a whole because it happens to relate to one particular type of creature, human beings. Our Latin title "Natura hominum" itself indicates this, for in Peripatetic terms that title would certainly not exclude the discussion of the soul and its faculties. Our arrangement is however influenced by the nature of the material which happens to survive, and which it seemed appropriate to group together under this single heading. It includes a considerable number of reports relating to Theophrastus' views on medical matters (some of which indeed may reflect, more than anything else, Galen's habit of citing predecessors in support of his own views liberally and to some extent indiscriminately; see below on **331**); a number of scattered reports concerning the body and its functions; and two treatises summarised by Photius, *On Fainting* and *On Paralysis*. Three more of Theophrastus' works in this area survive in MSS (*On Vertigo*, *On Tiredness* and *On Sweating*; **328** nos. 1, 10 and 12) and have been published from these (most recently in Wimmer's edition); an edition with commentary of these texts is in preparation as part of Project Theophrastus, and will provide a context for further discussion of Theophrastus' physiological views. Although we have generally separated reports about the human body from those concerning other living creatures, human and animal reproduction have been treated together (below, **376-383**); this again reflects the nature of the reports we happen to have.

Many of the texts, especially those from Galen, portray Theophrastus as in general agreement with Aristotle. This is a phenomenon not confined to this particular area of Theophrastus' activity (compare for example **151B** and, from a much less reliable author, **162**), and is in itself likely enough; though the more general in character such reports of agreement are, the more we need to ask whether they have any basis in reality. (See further the general Introduction to the present volume.) Other reports are concerned with specific points in which it is difficult to see any general significance (e.g. **349**), or are unreliable (**342-4**) or simply mistaken (**340**). One significant theme is the emphasis placed by Theophrastus on the function of breath (*pneuma*).⁴ Some have argued that Theophrastus diverges from Aristotle, and anticipates Strato and Erasistratus, in that for the former *pneuma* was concentrated in the region of the heart while for Theophrastus it extends throughout the body; but Aristotle's own position on this issue is open to debate. See further below on **346**. Longrigg, (1975) and (1993) 158-9, argues that there is an inconsistency between Aristotle's physical theory, in which air is warm rather than cold, and his biology, in which breathing has a cooling function, and that Theophrastus follows the latter theory; see the commentary on **169-183**.

In *On Fainting*, **345**, emphasis is laid on the part played by heat and cold, rather than on *pneuma*, and two themes occur, that of the greater fire extinguishing the smaller and that of cold concentrating heat, which are present in Aristotle but particularly prominent in Theophrastus and in the pseudo-Aristotelian *Problems*. Heat is also important in **347** and in Theophrastus' account of harmful waters.⁵ On Theophrastus' interest in the effects of poisons see also below on

⁴ Cf. Regenbogen (1940) 1404-5, and below on **346**. *On Sweating* begins by asking, and deferring to another occasion, the question whether perspiration is caused by the excretion of moisture directly or by *pneuma* which condenses on the outside of the body (§1; the reference to *connate* *pneuma* is however an emendation by Schneider, as Bill Fortenbaugh points out to me). However, repeated reference is made in the solution of particular problems to the ease or otherwise with which *pneuma* passes through the body (§§8-9, 26, 38; cf. [Aristotle] *Problems* 2.4,20). In *On Vertigo*, although *pneuma* or a moist residue from food or wine are mentioned as causing giddiness in the same way as movement of the head, by inducing uneven movement in the fluid within (§§1,12), the major part of the text is concerned with explaining problems relating to giddiness in terms of mechanical movement.

⁵ Cf. **213**, **214A** 21-4 and Steinmetz (1964) 258-60, arguing that the harmful effect of certain waters was attributed by Theophrastus either to their extreme coldness or to an earthy admixture. See also below, on **369**.

360-1, and Scarborough (1978) 376-7 (antidotes have the effect of “loosening”). Scarborough (1992) 152 however notes that the explanation in [Aristotle] *Problems* 1.42 of drugs as substances too hot or cold to be concocted by the body is conspicuous by its absence in *HP* 9.

Of the *fortuna* of Theophrastus’ physiological writings there is little to be said. Diogenes Laertius’ catalogue of Theophrastean book titles derives from Hermippus in the third century B.C. (Usener [1858] 22-4; Sollenberger [1992] 3854), and so is not in itself evidence for knowledge of contents, as opposed to titles, beyond that date. In spite of the very general character of the references in Galen (for which see below on **331-6**), their very number makes it hard to believe that he did not have acquaintance, and probably direct acquaintance, with some of Theophrastus’ writings, even if his actual reports may often reflect general impressions rather than detailed reference to particular passages. Otherwise, apart from isolated reports, often preserved in specialised traditions (such as the grammarians who reported part of **347B** because of their interest in the form of the genitive case of the word for “pepper”) there is not much sign of interest or influence—a fact which may have much to do with the development in Alexandria of physiological studies based on a new understanding of anatomy, and with the decline of the Lyceum in this field (see below on **328** no. 15). The real puzzle is how Photius in the ninth century A.D. was able to come across a manuscript containing physiological and zoological works of Theophrastus, some of which survive in the manuscript tradition as we know it but others of which do not; see below on **346**.

328 List of Titles Referring to Works on Human Physiology

1 *On Vertigo and Dizziness*

Edited by Wimmer (1866) 401-3. See Regenbogen (1940) 1405; Wehrli (1983) 485.

This short work survives both in MSS and in relatively full summary by Photius.⁶ [Aristotle] *Problems* 6.4 discusses the same problem as

⁶ On Photius’ technique of excerpting cf. Burnikel (1974) 131-142; Sharples (1988) 52; and below on **346**.

§12 (Wimmer) of the Theophrastean work, with the same parallel as in Theophrastus §2 Wimmer to the impossibility of spinning raw eggs because the fluid inside them is not moved as a unity.⁷ The discussion in §§9-10 Wimmer of why dizziness results also from staring at a stationary object occurs also in a compressed form at [Aristotle] *Probl. Ined.* 2.42 p. 299.31-46 Bussemaker = [Alexander] *Problems* 4.42 p. 11.13-22 Usener. See also above n. 4.

2 *On Fainting*

See below on **345**.

3 *On Choking or On Suffocation*

See below on **347**. "About those who are strangled" in **347B** is Oribasius' heading rather than the title of Theophrastus' work; see the Commentary there.

4 *On Paralysis*

See below on **346**.

5 *On Epilepsy*

Regenbogen (1940) 1405.

The work is referred to by Apuleius in **362B** = Rose (1863) p. 237 no. 29 (222); remedies for epilepsy are cited from another work, *On Creatures said to be Grudging* = **350** no. 7, in **362A-D**.

6 *On Plagues*

Nothing certain is known of this work.

The following three items, 7-9, might belong rather under ethics, but Regenbogen (1940) 1396 treats them as physiological. Conversely, book 3 of the [Aristotle] *Problems*, on drunkenness, may relate to the lost Theophrastean work on that topic (**436** no. 31; cf. Flashar [1962] 322), and is largely physiological in content; however, the citations of Theophrastus' work by title (mostly preserved by Athenaeus) belong

⁷ On the general question of the relation of the [Aristotle] *Problems* to Theophrastus cf. Flashar (1962) 320-22, 335-40.

more naturally under ethics, and we have therefore placed them there (569-579). Cf. Regenbogen (1940) 1485.

7 *On Melancholy*

Rose (1854) 191. Regenbogen (1940) 1402-3. Flashar (1962) 711-722. id. (1966) 61-8. Wehrli (1983) 485. P.H. van der Eijk, 'Aristoteles über die Melancholie', *Mnemosyne* 43 (1990) 33-72, especially 70-1 n. 91.

Rose regarded the (very long) [Aristotle] *Problems* 30.1, on the same topic, as an excerpt from this text, and Regenbogen, noting the frequent uncertainty whether a work was by Aristotle or Theophrastus (cf. below n. 85) saw no objection to this in the fact that Cicero (*Tusculan Disputations* 1.33) and Plutarch (*Lysander* 2) cite the *Problem* as Aristotelian. Prantl had noted that the reference to a work on fire at 935a20 could be to Theophrastus, *On Fire* 35; though it might also be to a lost book of the *Problems* on fire mentioned by Camotius.⁸ Van der Eijk, while not regarding the text of *Problems* 30.1 as it stands as a work of Aristotle himself, stresses the Aristotelian nature of its doctrine and the connections between it and other Aristotelian works; he is dubious about the identification with the Theophrastean work, pointing out that *On Fire* 35 does not fit the cross-reference very well, and suggests that the Theophrastean title recorded by Diogenes may belong rather with ethics and the study of character.

Problems 30.1 emphasises the positive aspects of a melancholic temperament, explaining the fact that its effects can be good or bad by black bile's being particularly receptive either of heat or of cold; comparison is also made between the effects of black bile and those of wine, both, it is argued, containing a considerable amount of "breath". Empedocles, Plato and Socrates are mentioned among those of melancholic temperament (953a27); cf. the reference to Heraclitus in 233. Flashar (1966) 63 n. 7 suggests that Heraclitus was mentioned in the source of *Problems* 30.1 too.

Flashar (1962) 727 suggests that [Aristotle] *Problems* 30.14, presented as a problem about dreams but in fact an analysis of sleep referring to the disturbed sleep of the melancholic, is also an extract from this Theophrastean work.

⁸ Flashar [1962] 671, 720.

8 *On Derangement*

Joachim (1892) 15. Giannini (1966) 235. Flashar (1972) 40, 83.

Joachim, Giannini and Flashar suggest that *Mirabilia* 31-2 may come from this work. 31 refers to a madman at Abydus who went into the theatre and watched as if people were acting, for many days, and on recovering said he had had the most pleasant time of his life;⁹ 32 refers to a wine-seller at Tarentum who was mad at night but sold wine by day, and kept his key on his belt so that no-one took it though many tried.

9 *On Inspiration*¹⁰

The citations from the work in **726** relate to claims that music could cure both physical and mental disorders; for the connection of music with "inspiration" or "possession" (*enthousiasmos*, the term here) and the catharsis thereof cf. Aristotle, *Politics* 8.7.

10 *On (Types of) Tiredness*

Edited by Wimmer (1866) 398-401. See Rose (1863) 230; Regenbogen (1940) 1403-4; Wehrli (1983) 485.

This work, which survives in MSS and in Photius' summary, is—in spite of what is said at the start of §5 Wimmer, "there is nothing to prevent tiredness coming about for a plurality of reasons"—not so much a discussion of different *types* of tiredness as a survey of problems connected with its occurrence in various contexts. "Tiredness" might also be rendered "fatigue" or "weariness". The first part of the work is concerned with general theory, the second with individual problems; there are numerous excerpts from the latter in [Aristotle] *Problems* 5.¹¹ Photius too concerns himself entirely with the second part of the work.¹² See also below, on **341**.

⁹ Flashar compares *Mirabilia* 178 and Heraclides of Pontus fr.56 Wehrli (for madmen after recovering saying they have had the happiest times of their lives) and Horace, *Epistles* 2.2 128-30 (for imaginary theatre-performances).

¹⁰ A number of titles in **328** and elsewhere use the plural in a way which is natural in Greek but not in English; so here no. 9b, literally "On Inspirations". The plural may indicate either "types of" or just "cases of", and we do not always have enough evidence about a particular work to say which. Certainly "types" should not be taken as indicating that we are necessarily dealing with strict and formal classifications. See below on **328** no. 10.

¹¹ Cf. Flashar (1962) 470.

¹² See above, n. 6.

11 *On Sleep and Dreams*

Regenbogen (1940) 1402. Del Corno (1969) 68-9.

See below, on **341**, and compare **342-4**; also perhaps Priscian, *Answers to Chosroes* 3 (*Suppl. Arist.* 1.2 p. 62.7ff. Bywater), discussed below on **341**.

12 *On (Types of) Sweating*

Edited by Wimmer (1866) 403-8. See Regenbogen (1940) 1404-5; Wehrli (1983) 484.

This work survives in MSS and in Photius' summary, again concentrating on the sections concerned with "problems".¹³ [Aristotle] *Problems* book 2 contains numerous excerpts.¹⁴ See also above n. 4.

13 *On (Types of) Hair*

Nothing certain is known of this work. Aristotle discusses hair at length in *HA* 3.10-12. Cf. **218** and **365A**.

14 *On Secretion*

Usener (1858) 9. Regenbogen (1940) 1405.

This is linked by Usener and Regenbogen with no. 12 *On (Types of) Sweating*, the word "secretion" (*ekkrisis*) occurring in §§12 and 14 (Wimmer) of that work. The term applies to the elimination of all types of bodily residues.

15 *On Breaths*

Usener (1858) 21. Regenbogen (1940) 1408. Steinmetz (1964) 352.

The title could mean "On Breaths" or "On Winds". Usener, followed by Regenbogen and by Steinmetz, interprets it as a variant for **137** no. 16a. The question also arises of the relation of this title to the pseudo-Aristotle *On Breath* (*Peri pneumatos*), described by Annas as "A depressing work, showing clearly that medicine and psychology in the Lyceum were aware of, but not abreast of, the work in the shiny new research centre at Alexandria".¹⁵ Regenbogen (1940)

¹³ See above, n. 6.

¹⁴ Cf. Flashar (1962) 423.

¹⁵ Annas (1992) 27; text at Aristotle, pp. 481-6 Bekker. Meurs wanted to read the

1545-6 points to similarities between this work and the works of Theophrastus and suggests that the possibility that it is by him should be considered; but the points he notes can be interpreted as evidence of Theophrastean influence only, rather than authorship, and as Annas points out the work shows knowledge of Erasistratus.¹⁶ Cf. below on **346**.

WRITINGS ON HUMAN PHYSIOLOGY

- 329** Theodoret, *Remedy for Greek Attitudes* 5.82 (*BT* p. 148.16-23 Raeder)
Theodoret (c.393-466 A.D.), bishop of Cyrrhus in Syria, friend of Nestorius and critic of Cyril of Alexandria, wrote his *Remedy for Greek* (=pagan) *Attitudes* as a comparison of pagan and Christian views on a range of issues of concern to both. The present passage is from the conclusion of his discussion of the nature of human beings, stressing the limitations of human understanding of this subject. Theophrastus is cited among a list of authorities on body and soul, without any clear connection of individuals in the list with body, soul or both. Galen certainly was interested in both; and he held that the same was true of Hippocrates. By Theodoret's time Galen's view of Hippocrates prevailed;¹⁷ so Theodoret probably intends to connect all the names in the list with both body and soul. Medical knowledge is among the types of expertise claimed by Heliodorus posing as Theophrastus in **139** 15-24, q.v.; see also **352** and **362**.

FACULTIES ORIGINATING IN THE HEART

- 330** Galen, *On the Doctrines of Hippocrates and Plato* 6.1.1-2 (*CMG* vol. 5.4.1.2 p. 360.4-12 De Lacy)¹⁸
De Lacy (1984) 659.

singular *pneumatōs* in our title. An *On Breath* in three books appears in a section of the catalogue of Aristotle's works in Ptolemy's *Life* which also includes "*Problems concerning Hiding*" (i.e. hibernation or aestivation; cf. **350** no. 10); Moraux (1951) 296, Roselli (1992) 13.

¹⁶ Annas loc. cit.; cf. 483b5-19 and Roselli (1992) 10-11. This argument is not dependent on the claim that the last chapter is an integral part of the work, rather than a later addition as Jaeger (1913) 72 supposed; but in fact that claim is rejected by Roselli (1992) 121-2.

¹⁷ I am grateful to Vivian Nutton for emphasising this point.

¹⁸ This text is also printed by De Lacy among the testimonia for book 1 of Galen's

Galen draws a contrast between the Peripatetic connection of the soul-faculties with the heart and the Platonic connection of the three faculties—reason, the spirited faculty, and desire—with brain, heart and liver respectively. For the heart as the source of the soul-faculties in Aristotle cf. *PA* 2.1 647a25ff., *MA* 10 703a12, *GA* 2.6 742b36;¹⁹ though intellect, which has no bodily organ, is an exception (*GA* 2.3 736b29-30).²⁰ For the Platonic view cf. *Timaeus* 69-70, though Plato's formulation is less precise, speaking of the lowest part of the soul as "dwelling in the region of (*peri*) the liver" (71d2). Galen himself endorses the Platonic view.²¹

Galen then breaks off his discussion to contrast both these views with Chrysippus' rejection of the Platonic division of soul-faculties into reason, the spirited faculty and desire. Since "the early philosophers" (*palaioi*, as here, or *arkhaioi*) is a standard term for those before the Stoics (cf. **111D**, **112A** nn. 1-2), Galen's words here could suggest that Aristotle distinguished the same three soul-faculties as Plato. He did not in fact do so, but Galen in the present work repeatedly claims that he did,²² and supports this claim by identifying Plato's faculty of desire with Aristotelian nutritive soul.²³ For Galen Aristotle differs from Plato in locating all three faculties in a single organ, the heart,²⁴ but not in the division itself.

The question arises what basis, if any, Galen had for what he says here about Theophrastus. De Lacy notes that the view attributed to Theophrastus here is not elsewhere attested for him. Galen may simply be coupling Theophrastus with Aristotle in a mechanical fashion (cf. above on **328-349**); but that Theophrastus did in fact share Aristotle's view on the importance of the heart is likely enough.

On the Doctrines of Hippocrates and Plato (CMG vol. 5.4.1.2 p. 64.1-25).

¹⁹ Peck (1942) 580.

²⁰ For Aristotle the soul is form rather than matter; it is the first actuality of a body which potentially possesses life, i.e. of an organic body. He is not therefore to be understood as *identifying* the soul with the heart, or as locating the soul in the heart alone; rather, the heart, as the seat of the connate *pneuma* and vital heat, is for him the primary vital organ.

²¹ Cf. *On the Doctrines of Hippocrates and Plato* 6.3.1 (CMG vol. 5.4.1.2 p. 372.16ff. de Lacy), 7.3.2 (CMG vol. 5.4.2.2 p. 438.28-440.6 de Lacy). J. Mansfeld, 'The idea of the will in Chrysippus, Posidonius and Galen', in J.J. Cleary (ed.), *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 7 (1991), 107-57, at 127ff.

²² Galen, *On the Doctrines of Hippocrates and Plato* 5.4.3, 5.7.3, 5.7.50; and below, n. 24.

²³ *ibid.* 6.3.7. Cf. De Lacy (1984) 662.

²⁴ *Ibid.* 3.7.50, 4.1.11; and, without naming the three Platonic faculties, also 3.7.8, 6.2.5.

For Theophrastus' view of soul and of the relation of soul to body see **269** and **271**. Theophrastus is cited by Galen in his attack on Chrysippus earlier in the present work, at our **114**, but in connection with logical method rather than for his physiological or psychological doctrine.

THE FOUR PRIMARY QUALITIES, THE FOUR HUMOURS, THEIR BLENDING

331-336 The texts in **331-336** all derive from Galen, many of them from polemical contexts. Galen adopts a physiology based on the doctrine of the four primary qualities (hot, cold, moist, dry) and the four humours (blood, phlegm, yellow bile, black bile); health is the good blending or tempering of the four humours. In defending this physiology against rival theories, he frequently gives lists of distinguished predecessors both medical and philosophical who have held these views; Theophrastus sometimes appears in these lists and sometimes does not.²⁵ The doctrine of the four primary qualities is certainly Peripatetic, and there is no reason to doubt Galen's inclusion of Theophrastus among those who held these general views;²⁶ but the nature of Galen's polemic, and the number of authorities that he cites, suggest that it would be a mistake to see his evidence as reflecting immediate consultation of the details of particular Theophrastean sources. See further below.

331A-C Galen, *Against Julianus* 4.4 (CMG vol. 5.10.3 p. 43.13-19), 4.14 (CMG vol. 5.10.3 p. 46.19-47.4), 5.10 (CMG vol. 5.10.3 p. 50.13-21 Wenkebach)

Rose (1863) 387. Wenkebach, CMG vol. 5.10.3, ad locc.

See above, general note on **331-6**. Julianus was a member of the Methodical school of medicine; Eudemus (in **331C**) not Theophrastus' colleague in the Lyceum, but an anatomist contemporary with Erasistratus.

²⁵ See Bertier (1972) 6-7; Hankinson (1991) 89. Ironically enough, it was Galen's appeals to Theophrastus' authority that led the sixteenth-century Theophrastus Bombastus von Hohenheim, otherwise known as Paracelsus, to attack his Eresian namesake as well as Galen. Cf. Sharples (1985) 187-8 and nn. 68-9.

²⁶ Good blending even in melancholy persons is mentioned at [Aristotle] *Problems* 30.1 955a35; see above on **328** no. 7.

tratus in the first half of the third century B.C. The Stoics are mentioned in the sequel to **331A**, as well as in **331B**; indeed, **331A** forms part of von Arnim, *SVF* 2.771. For Plato see below on **331F**.

331D-E Galen, *On the Natural Faculties* 2.4 (*BT* p. 165.12-19), 2.8 (*BT* p. 181.11-23 Helmreich)

Furley (1985) 609 and n. 9. Furley and Wilkie (1984) 26-37.

Erasistratus wrote on medicine in Alexandria in the first half of the third century B.C., and is frequently attacked by Galen for his use of mechanical explanations in physiology. Galen's reference to Aristotle and Theophrastus in **331D** is preceded by a reference to Erasistratus' followers having claimed that he was familiar with the Peripatetic philosophers, and followed, a page or so later, by another similar reference to Erasistratus' alleged association (*homilia*) with "these philosophers"—which refers back immediately to "the Peripatetics", and thus to Aristotle and Theophrastus in **331D**. See **18** no. 8 and **47**. Diocles of Carystus was a major fourth-century B.C. medical writer who was influenced by the Sicilian school of medicine and in turn influenced Aristotle and his school, though the question of priority here has been controversial (see below on **362F**). Praxagoras was a medical writer of the second half of the fourth century B.C. notable for his belief that the arteries contain air (see below on **346**). Philistion was the leading member of the Sicilian school and was active in the first half of the fourth century B.C.

For heat and cold as the active elements (**331D**.4-5) cf. Aristotle, *On Coming-to-be and Passing-away* 2.2 329b24-32, *Meteorologica* 4.1 378b10ff.²⁷ However, the citing of the hot in particular as the most active (**331D** loc. cit., **331E**.8-10) is characteristic of Aristotle's biology rather than his physics, and Theophrastus followed him in this. See above on Human Physiology: Sources and Doctrines; Longrigg (1975) 216-221; and the Commentary on **171** and **177**.

331D was copied by [Galen] *On Hippocrates' De alimento* 3.14 (vol. 15 p. 307.4-9 Kühn), not included here because it is a Renaissance compilation (A. Nelson, cited by H. Diels in his report on *CMG*, Sitzb. Berl. 1914 128).

²⁷ Furley (1983) 74.

- 331F** Galen, *On the Doctrines of Hippocrates and Plato* 8.5.21-4 (CMG vol. 5.4.1.2 p. 508.28-510.5 De Lacy)

De Lacy (1984) 689-90.

This is from a context where Galen is arguing for the superiority of Hippocrates to Plato; for Plato does not treat the humours as natural (unlike the treatise *On the Nature of Man* attributed to Hippocrates, which Galen goes on to quote after this passage). Indeed, he regards bile and phlegm as morbid products,²⁸ as is pointed out by a scholium attributed to Theodorus, and noted by De Lacy, on the present text in MS F of Galen.²⁹ Galen however seeks to harmonise Plato and Hippocrates by emphasising that Plato attributes most diseases to the humours rather than the elements.

For Diocles and Praxagoras see above on **331D-E**. Pleistonicus and Phylotimus were pupils of Praxagoras; Mnesitheus a doctor of the mid-fourth century B.C. (see below on **419**; the present text is Mnesitheus fr.15 Bertier [1972]). Herophilus was also a pupil of Praxagoras and was active in the first half of the third century B.C.; he practised dissection of the human body in Alexandria and was among the most important of ancient anatomists.

Our text is also reproduced in [Galen] *On Hippocrates' De alimento* (3.21, vol. 15 p. 345.14-16 and 346.9-19 Kühn), a Renaissance compilation (see above on **331D**).

- 332** Galen, *On the Method of Treatment* 1:2 (vol. 10 p. 9.2-10.3 Kühn)

Hankinson (1991) 7, 89.

Galen is attacking Thessalus of Tralles (first century A.D.), leader of the Methodist school of medicine, for his rejection of Hippocratic treatments as harmful and developing of a new medical system. Our passage comes from early in Galen's treatise, and the concern of the passage is with attitudes to tradition rather than with specific medical arguments. Hankinson observes that, while Galen is right to claim that a great number of distinguished figures in the past would have opposed Thessalus' rejection of elaborate theory, Galen is too ready to blur the distinctions between various earlier views and assimilate

²⁸ Cf. Plato, *Timaeus* 82-5, and F.M. Cornford, *Plato's Cosmology*, London: Routledge and Kegan Paul, 1937, 332-343.

²⁹ The scholium is printed at CMG vol. 5.4.1.1 p. 29 De Lacy.

them all to the position of Hippocrates. **128** and **130** come from a later part of this same attack on Thessalus.

- 333** Galen, *On Initiating Causes*, Latin version by Nicholas of Rhegium, 15.102-3 (CMG suppl. 2 p. 52.13-18 Bardong)

Bardong, CMG suppl. 2 ad loc.

The Greek original of this work by Galen is lost, the Greek text printed by Bardong being his own retranslation from the Latin version made by Nicholas of Rhegium in the first half of the fourteenth century A.D.³⁰ This passage comes from the peroration of an attack on Erasistratus, whom Galen presents as arguing that *plêthôra*, repletion with undigested nutrition, is not the cause of disease because it is not the proximate cause, but rather gives rise to other factors which themselves cause the disease. Polybus was Hippocrates' son-in-law and pupil.³¹ Euryphon was a Cnidian doctor, an older contemporary of Hippocrates. For Galen's opposition to Erasistratus cf. **331D-E** above; for the importance of right proportion, which is what is threatened by excess, see **334-6** below.

- 334** Galen, *On the Doctrines of Hippocrates and Plato* 5.3.17-18 (CMG vol. 5.4.1.1 p. 308.25-34 De Lacy)

Galen is here attacking Chrysippus for confusing health and beauty in the case of the soul, even though he, like all others whatever their physical theory, distinguished them in the case of the body.³² Theophrastus appears, as elsewhere, among the supporters of the four-quality theory. Emphasis on balance and proportion was fundamental to Greek physical theory in general from its beginnings,³³ and to

³⁰ On Nicholas cf.: L. Thorndike, 'Translations of works of Galen from the Greek by Niccoli da Reggio (c.1308-1345)', *Byzantina Metabyzantina* 1 (1946) 213-35; R. Weiss, 'The translators from the Greek of the Angevin court of Naples', *Rinascimento* 1 (1950) 195-226, at 216-225; R.J. Durling, 'A chronological survey of Renaissance editions and translations of Galen', *Journal of the Warburg and Courtauld Institutes* 24 (1961) 230-305, at 233; V. Nutton, *From Democedes to Harvey*, London: Variorum, 1988, XI.16-17, XVII.248.

³¹ Galen, *On Hippocrates' On the Nature of Man*, prologue, CMG vol. 5.9.1 p. 8.22.

³² Philoponus *On Aristotle's On the Soul* 145.2-3 reports Aristotle in the *Eudemus* (= fr.45 Rose³/fr. 7 Ross) as saying, in an argument against the theory of soul as harmony, that disharmony or disproportion of the elements is disease, of the uniform parts weakness, and of the organic parts ugliness; harmony or proportion is respectively health, strength and beauty.

³³ It is implicit in Anaximander's treatment of the opposites as paying retribution

medical theory at least from the time of Alcmaeon. Asclepiades was a medical writer of the first century B.C.; cf. J. Vallance, *The lost medical theory of Asclepiades of Bithynia*, Oxford: Clarendon Press, 1990. For “homoiomeries”, or more strictly “homoiomorous things”, as a term applied to Anaxagoras’ theory cf. the discussion at G.S. Kirk, J.E. Raven and M. Schofield, *The Presocratic Philosophers*, 2nd ed., Cambridge: Cambridge University Press 1983, 376-8.

335 Galen, *On Blendings* 1.3 (BT p. 9.20-9 Helmreich)

“Blending”, *krasis*, is often translated “temperament”, but we have preferred the former translation to make it clear that it is physical theory that is involved. The general context of the passage is an attack by Galen on his predecessors for discussing temperaments in which each of the four humours predominate, but failing to discuss good temperament; they may claim to have done so by saying that the good temperament is warm and moist, and if they say this they may seem to have Aristotle, Theophrastus and the Stoics on their side; but, Galen goes on to say, those who argue thus are interpreting Aristotle and Theophrastus in an over-simplified way. (See the passages under **336**). Athenaeus of Attaleia, who was active in the reign of Claudius (41-54 A.D.), was the founder of the Pneumatist school of medicine. For proportion of the elements as health in Aristotle see also on **334**, and cf. [Aristotle] *Problems* 1.11 860b12.

336A Galen, *On Blendings* 1.5 (BT p. 17.10-21 Helmreich)

336B Galen, *On the Constitution and Powers of Simple Drugs* 3.4-5 (vol. 11 p. 547.3-548.10 Kühn)

336C Galen, *On the Method of Treatment* 2.5 (vol. 10 p. 110.17-111.14 Kühn)

Rose (1863) 386. Hankinson (1991) 55-6, 191-2.

In **336A** and **336B** Galen criticises those who interpret the qualities in an over-simplified way; the blend in a living creature is not the same as that in the seasons of the year (**336A**), and the qualities of substances in relation to the human body are not the same as their qualities in themselves or without qualification (**336B**). In both contexts Galen contrasts the views of Aristotle and Theophrastus them-

to each other; and we do not know enough about Thales to assert confidently that he did not also have similar ideas.

selves with such over-simplified interpretations. This is a characteristic move on his part; cf. our **128-130**, **418** and **430**. For references to such blendings by Aristotle see above on **335**, and for “dry” and “moist” used in several senses (though not indeed in the specific context of the human body) cf. Aristotle, *On Coming-to-Be and Passing Away* 2.2 330a12. In **336C** Theophrastus and Aristotle along with many others are listed as those to whom the supporters of the four-quality theory can appeal to show that there are many different sorts of bad blending, but the main concern is with styles of argument; see below.

In **336A** “these people” = those who rely on reason alone, to the exclusion of experience. Specific reference has been made in what precedes to the followers of Athenaeus (cf. **335**), but the reference here is more general. In **336B** Galen is arguing for the importance of the four primary qualities and the need to analyse which of them predominates in a drug, but in terms relative to human beings rather than in absolute ones.

In the context of **336C** Galen is attacking those who profess a Dogmatist approach but in his view fail to carry it through consistently by answering all theoretical questions, and instead resort to wrangling. Our extract follows a reference by Galen to one person identifying a case of indigestion as due to an excess of dry and cold, a second identifying it as due to an excess of cold and wet, and a third who describes such a theoretical approach as useless. The third person is said to call on Erasistratus and Herophilus as witnesses; the first two will according to Galen be able to call on many earlier doctors and philosophers, Theophrastus among them. Galen’s main concern in the passage is to attack the followers of Erasistratus for calling on him as an authority rather than examining the arguments; in effect Galen’s point here amounts to a claim that, if it is to be a matter of citing authorities, the four-quality theory has more on its side. For Galen’s hostility to Erasistratus see above on **331D-E**. For Diocles and Philistion see on **331D-E**; for Mnesitheus and Pleistonicus, **331F**. **336C** is Mnesitheus fr. 3 Bertier (1972).

In the penultimate sentence of **336B** the cruces in our first printing should be removed, and the translation emended to read “How else than as equivalent to (whether it has) the power of making human bodies drier”, understanding *einai* with *tôî*.³⁴ For the relative dryness of sea-water cf. [Aristotle] *Problems* 23.10 and 39.

³⁴ I am grateful to Phillip De Lacy for explaining this.

TWO TYPES OF DISEASES

- 337** Galen, *On the Method of Treatment* 2.6 (vol. 10 p. 118.2-8 Kühn)

Rose (1863) 386. Hankinson (1991) 59, 195.

As in **336C** which comes shortly before, Galen is attacking those who profess a Dogmatist approach but fail, in his view, to adopt such an approach consistently. And, once again, Galen places Aristotle and Theophrastus in the Hippocratic tradition. “The associates of (*hoi peri*) Aristotle and Theophrastus” could be a periphrasis for Aristotle and Theophrastus themselves, *hoi peri* often being used thus. We have chosen to translate in a way that does not force the issue; but it is not certain that Galen has in mind any statements specific enough for it to be relevant even to ask whether he has in mind Aristotle and Theophrastus in particular or the Peripatetic school in general.³⁵ It is indeed to Aristotle that the distinction between uniform parts (tissues) and organs is owed, and that may have been enough to prompt Galen’s remark. Literally the end of the sentence runs “in uniform bodies and in (bodies) that are called organic”, but this is not the most natural use of “organic” in English and we have preferred a less literal translation to avoid misunderstanding.

BODILY PARTS

- 338** Calcidius, *On Plato’s Timaeus* 47B-C (266, p. 271.7-11 Waszink)

J.H. Waszink (ed.), *Timaeus: Calcidius (Plato Latinus, 4)*, London: Warburg Institute and Leiden: E.J. Brill, 1962, 271.

Calcidius wrote his commentary on Plato’s *Timaeus* in the 4th century A.D., but whether he did so early in the century or at its end, and how his work relates to that of other Platonists, is disputed; cf. J. M. Dillon, *The Middle Platonists*, London: Duckworth, 1977, 401-8. Here he is commenting on Plato’s description of the benefits of eyesight, and reports the Stoics as calling sight a god and Theophrastus as calling it “form” or beauty. There is indeed an etymological connection between *eidos* “form” and *eidon* “I saw”, but it relates to the

³⁵ What follows the extract we have printed is Galen’s explanation, not material from Theophrastus.

form of a thing as it appears to the viewer, not, as Calcidius suggests Theophrastus said, to those who cannot see thereby being affected in appearance themselves.³⁶ However, ancient Greek thought and idiom did lay particular emphasis on the way in which the eyes reveal attitudes. Cf., perhaps, **281** and the Commentary there; also the importance of the eyes in rhetorical delivery in **713**. It may be that our passage comes from a context in rhetorical theory. *acies videndi* literally means “keenness of glance”; we have translated by “power of sight” to make it clear that the reference is not just to those who have lost keenness of sight, but to those who have lost the power of sight altogether.

339 Photius, *Lexicon*, on *nanos* (part 1 p. 286.9-11 Porson)

Leutsch and Schneidewin, *Paroem. Gr.* vol. 1 p. iii and vol. 2 pp. 540-1. Rose (1863) p. 536 no. 212a (551). O. Crusius, *Analecta critica ad paroemiographos Graecos*, Leipzig: Teubner, 1883, 91 n. 2.

Photius, patriarch of Constantinople in 858-67 and 878-86 A.D., compiled his *Lexicon* from earlier lexical sources before attaining this office.

It seems probable that “as a dwarf . . . member” is here being attributed to Theophrastus, as our punctuation implies; if Theophrastus were being cited simply as an authority for the use of the word *nanos* along with Neoclides and Aristotle, the change of case from dative to nominative would be awkward. However, it is less clear whether the following clause, “and indeed dwarfs . . . member”, is part of the citation of Theophrastus, or just Photius’ explanation. *goun* “and indeed” is quite common in the extant works of Theophrastus, though usually introducing a specific geographical example to support a preceding general statement. Neoclides is identified by Leutsch-Schneidewin as the fifth-century orator (cf. *RE* vol. 16.2 [1935] 2414 [G. Reincke]). For Aristotle’s use of *nanos* see below.

Our text is also cited (from the Suda) in Arsenius, *Violetum* p. 365.7-10 Walz = Apostolius, *Paroemiae*, cent. 11.97,³⁷ but with the alleged

³⁶ The subjunctive *sint* (line 5) indicates that Calcidius regards the explanation as well as the connection as Theophrastus’ own. He may indeed be mistaken.

³⁷ *Paroem. Gr.* vol. 2 p. 540.10-541.2 Leutsch-Schneidewin. These texts are omitted from our apparatus because of their late date; Apostolius is 15th century A.D., Arsenius 15th-16th century.

proverb³⁸ *nanos ôn hupeike*, “being a dwarf he yielded”, substituted for the simple lemma *nanos*. Leutsch-Schneidewin assigned the Apostolius passage to Theophrastus’ *Paroemiae* (cf. 727 no. 14), but Crusius argued that they were wrong to do so, claiming the alleged proverb is an invention and that it is only the use of the word *nanos* that the Suda attributes to Theophrastus. However, Professor Tsantsanoglou has pointed out to me that the source of the proverb and the attribution to Theophrastus of the latter part of the Suda’s material are two separate issues; and Vivian Nutton notes that the alleged proverb could be a fragment from comedy. The single word *nanos* is indeed cited from Aristophanes (fr. 427 Edmonds).

The large sexual organs of dwarfs (*nanoi*) are noted by Aristotle at *HA* 6.24 577b27. He compares them in this regard to *ginnoi*, described as the offspring of mules and mares or of mares that have been ill during pregnancy. Some forms of dwarfism do indeed involve disproportion of the bodily parts; cf. Aristotle *PA* 4.10 686b2 ff. (*nanoi*, *nanôdôs*) and (again with the comparison to *ginnoi*, though not the reference to privy members) *GA* 2.8 749a4 (where the word used is rather *pugmaioi*); [Aristotle] *Problems* 10.12. Cf. Flashar (1962) 512.

FOOD AND DIGESTION

- 340** (Spurious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 2.21 44BC (*CB* vol. 1 p. 108.11-13 Desrousseaux)

K. Hubert, ‘Zur Entstehung der Tischgespräche Plutarchs’, *XARITEΣ Friedrich Leo zum sechzigsten Geburtstag dargebracht*, Berlin: Weidmann, 1911, 170-87, at 171. Id., ‘Zur indirekten überlieferung der Tischgespräche Plutarchs’, *Hermes* 73 (1938) 307-328, at 325. F. Hackmann, *De Athenaeo Naucratis quaestiones selectae*, Diss. Berlin 1912, 56 n. 89. I. Düring, ‘Athenaios och Plutarchos’, *Eranos* 34 (1936) 1-13, at 12. F. Fuhrmann, *Plutarch: Œuvres morales* 9.2, *CB* 1928, 127 n. 3. P.A. Clement and H.B. Hoffleit, *Plutarch: Moralia* vol. 8, *LCL* 1969, 296-7. J.F. Kindstrand, ‘Sostratus-Hercules-Agathion: the rise of a Legend’, *Annales Soc. Lit. Human. Uppsal.* 1979-80, 51-2. Teodorsson (1989-90) vol. 2.20.

In Plutarch’s version in *Table-Talk* 4.1 660E Philinus is a character

³⁸ Which could in origin be a comic fragment: I am grateful to Vivian Nutton for this suggestion.

in the dialogue, whose student is sent out for food and brings back only cheese and figs; at this the host Philo says that "Philinus has been bringing up a Sosastrus³⁹, who took no food or drink but milk throughout his life", Σώσαστρον ἡμῖν ὑποτρέφει Φιλῖνος, ὃν φασι μήτε πότεν χρησάμενον ἄλλῳ μήτ' ἐδέσματι πλὴν γάλακτος διαβιώνει πάντα τὸν βίον. It seems certain that the relative clause refers to "Sosastrus", but that Athenaeus, using this passage of Plutarch as his source, mistakenly applied it to Philinus,⁴⁰ if indeed this mistake is not rather due to the epitomator of Athenaeus (Hubert, 1911).

Hubert (1911) and Kindstrand argue that the attribution to Aristotle or Theophrastus, too, is Athenaeus' mistake, Kindstrand suggesting that the error was prompted by the subject of vegetarianism.⁴¹ But Hackmann argues against Hubert that Athenaeus and Plutarch may be drawing on a common source, or alternatively that the epitomator of Athenaeus may have compressed the text in a way that linked Aristotle's and Theophrastus' names with an item to which they did not originally belong; and Teodorsson suggests that the common source of Plutarch and Athenaeus is the *Hupomnēmata* (727 no. 6) cited by Athenaeus in 373 and 587, and by Diogenes in 1.237, as of uncertain authorship.⁴²

As for "Sosastrus", this name occurs nowhere else and has generally been regarded as corrupt. In some MSS the name appears rather as Zoroaster (cf. Hoffleit in Clement and Hoffleit 296-7), and this reading is endorsed by Teodorsson. Zoroaster lived on cheese for twenty years according to Pliny, 11.242. Kindstrand however argues, in spite of the chronological difficulties others have seen, for the identification, suggested by Xylander, with a person called Heracles by Herodes Atticus ap. Philostratus, *Lives of the Sophists* 2.1 552-4 but Sostratus or Heracles by Lucian, *Demonax* 1. He is described by Philostratus as living mainly on milk. Hoffleit prints "Sosaster", and refers for the name to Iamblichus, *Life of Pythagoras* 267; but the name

³⁹ Or "Sosaster"; so Hoffleit in the Loeb edition of Plutarch. Either form of the nominative could give rise to the accusative "Sosastron". See further below.

⁴⁰ As Christ-Schmid-Stählin ([1924] 736 n. 2 did later: cited by Kindstrand (1979-80) 51 n. 7. It would be difficult to suppose that the erroneous reference to Philinus originated in any source other than Plutarch, since Philinus is after all mentioned as a character in the dialogue rather than as an integral part of the story about Sostratus.

⁴¹ Cf. 531, 584-5.

⁴² Teodorsson actually says the *Historika hupomnēmata* (= 727 no. 7), but his reference to citations by Athenaeus shows he is identifying these with 727 no. 6.

of a Pythagorean given there is rather "Sosistratus" (p. 191.7 Nauck, St. Petersburg 1884, reprinted Amsterdam: Hakkert, 1965).⁴³

The passage is reported by Cornelius Agrippa (1486-1535), *De occulta philosophia* 1.58 p. 77 (ed. 1533, reprinted Graz 1967), presumably from Athenaeus (for Agrippa's use of Athenaeus see below n. 261), but citing only Theophrastus and not Aristotle.

341 Pliny, *Natural History* 28.54 (CB vol. 28 p. 37.23-38.4 Ernout)

I. Bywater, *Suppl. Arist.* 1.2, Berlin: Reimer, 1886, pp. 57,62. Regenbogen (1940) 1402. A. Ernout, *Pline l'ancien*, book 28, CB 1959, 134 nn. 2-3. del Corno (1969) 68.

Pliny cites (a) Aristotle and Fabianus⁴⁴ for people dreaming more in spring and autumn, and more if they lie on their backs than if they lie face down,⁴⁵ and (b) Theophrastus for food being digested with more difficulty by those lying on their backs than on their right-hand side.⁴⁶ The ostensible connection between the two points has to do with position while sleeping, though no doubt there is an implicit connection between dreams and difficulty of digestion too. That what Pliny cites here from Theophrastus comes ultimately from *On Sleep and Dreams* = **328** no. 11 was argued both by Hardouin (cited by Ernout) and by Regenbogen.

Dreaming is connected both with position while sleeping and with digestion in a complex argument, at Theophrastus *On Tiredness* (= **328** no. 10) §16 Wimmer, as to why those who are weary tend to have ejaculatory dreams.⁴⁷ This is there explained by the facts that (i) their bodies are warm and moist because of the liquefaction (*suntêxis*)

⁴³ Cf. also C. Hubert, *Plutarch: Moralia* vol. 4, BT 1938, ad loc.

⁴⁴ P. Fabianus Papirius, Papirius (54) in *RE* 18.3 1056-9 (W. Kroll), was a rhetorician with philosophical interests, contemporary with Tiberius and the teacher of the younger Seneca; he wrote on animals and on natural causes. Cf. Seneca *Moral Letters* 40.12, and 100 *passim*.

⁴⁵ The latter is indeed my own experience.

⁴⁶ It seems clear that Pliny in [b] is referring to the effect on digestion of position while sleeping; lying on the right side is linked with sleep, on the left with reclining while awake, at [Aristotle] *Problems* 6.5 886a3-9, 6.7 886a15-20, one point which is implied but not exactly stated in these texts being that lying on one's left-hand side while awake leaves the right hand free, and that most people are right-handed.

⁴⁷ The etymology of the term *exoneirôtikos*, "dreaming out", indicates a reference to ejaculatory dreams and not just to nocturnal emissions of semen which might or might not be accompanied by dreaming; indeed, at *Ga* 2.4 739a24-5, "what they call *exoneirôttein* ... happens also to those young males who are about to (emit) but

brought about by fatigue,⁴⁸ (ii) those who are tired lie on their backs, which is an “unequal” position and contributes to ejaculatory dreams,⁴⁹ and (iii) they are less able to digest their food. Lying on one’s back while sleeping is not *explicitly* linked to poor digestion here as it is in (b) of our text, but Theophrastus generally in *On Tiredness* links fatigue with liquefaction⁵⁰ and poor concoction (correctly as far as the second point is concerned, for fatigue is indeed linked with an excess of waste products), and Sollenberger (in an unpublished paper) suggests that the relevance of (ii) is that it, as well as (iii), contributes to poor digestion and an excess of fluid. The emission of semen during sleep is linked with sleeping on one’s back and with dreaming as *alternative* explanations at [Aristotle] *Problems* 10.16 892b15-18.⁵¹

The connection between dreaming and sleeping on one’s back, attributed by Pliny to Aristotle and Fabianus, occurs in Priscian of Lydia, *Answers to Chosroes* 3 62.26-7 Bywater, preceded by a connection not as here between spring and autumn and *frequency* of dreams, but between spring and autumn and false and disturbed dreams. This remark forms part of a section of Priscian’s discussion (62.7-28) which Bywater suggests may derive from Theophrastus, following on other material from Aristotle’s *On Dreams*.⁵² Theophrastus is not indeed mentioned in the immediate context, but his work *On Sleep and Dreams* is mentioned by Priscian as among his sources in the preface to the

do not emit anything” (ὁ καλοῦσιν ἐξονειρώττειν . . . γίνεται . . . καὶ τοῖς νέοις τῶν ἀρρένων τοῖς μέλλουσι μὲν μῆθεν δὲ προϊεμένοις) it seems to be the dream that is relevant, rather than whether there is any actual emission. The simple form of the verb *oneirōttein* and its noun and adjective derivatives are also common with reference to ejaculatory dreams. Cf. T. Hopfner, *Das Sexualleben der Griechen und Römer*, Prague: J.G. Calve, 1938, 94.

⁴⁸ This explanation appears also in [Aristotle] *Problems* 5.31 884a6-15; cf. *ibid* 3.33. See above on **328** no. 10; Hopfner, *op. cit.* 92. For *suntēxis* see below on **345**, and Peck (1942) lxvi.

⁴⁹ Cf. Diocles of Carystus fr. 141 (p. 182.17-183.1) Wellmann = Antyllus ap. Oribasius *Coll. med.* 6.1.5 (CMG vol. 6.1.1 p. 155.14-17 Raeder).

⁵⁰ Cf. Hippocrates, *Regimen (De victu)* 2.66; fatigue is caused by melted flesh not removed as sweat. Fatigue is linked with melting of flesh at *ibid.* 2.58, 2.59, 3.76; flesh is said to melt in sleep at 2.60 and through exercise at 2.62, 2.66, 3.78, 4.89; so too Galen *On The Preservation of Health* 3.5.14 (CMG vol 5.4.2 p. 85.10). I am grateful to Michael Sollenberger (in an unpublished paper) for these references.

⁵¹ Cf. Hopfner (*op. cit.*) 97. Flashar (1962) 514 notes that *Problems* 5.31 (above) and 10.16 each contain different parts of Theophrastus’ discussion in *On Tiredness* 16, and argues that the Theophrastean work is primary.

⁵² So too Brandis cited by Regenbogen (1940) 1402 (62.7-18); del Corno (1969) 68-9 (62.7-20).

whole work (42.5-6 Bywater = **328** no. 11b).⁵³ It thus seems likely that Theophrastus would have endorsed the whole of **341**, even if Pliny actually derived the first part of what he states here from a different source.

DREAMS

342-4 For Theophrastus' views on dreams, and the probable use of his treatise on the topic by Priscian of Lydia, see above on **341**.

Texts **342-344** derive from a highly unreliable source, the *Lumen Animae* or *Light of the Soul*. This collection of sermon-illustrations from natural history exists in three versions, of which only the second, *Lumen Animae* B, apparently compiled by a "Gotfredus canonicus Vorowensis" probably in 1332, has ever been published as a printed text—in four editions before 1500 and in none since.⁵⁴ Versions A (by Berengar of Landorra, between 1316 and 1330) and C (Austrian, between 1332 and 1357) have never been printed.⁵⁵ The collection is notorious for the untrustworthiness of its citation of sources, and for the way in which the attributions of the same passages vary between and even within the versions. The list of sources in the prologue of version B⁵⁶ relates not to the contents of version B, but to the prologue and contents of A. It includes many titles otherwise unattested, which may be pure fictions, genuinely lost works, or confused (and second-hand?) references to works normally known under other titles.⁵⁷

Given the present state of our information about this text, of which no complete critical edition or analysis has yet been made, the boundary between cynical invention of sources in order to impress on the one hand, and honest confusion by the compiler or his sources on the other, is indeed not an easy one to draw. However, an examination of the Theophrastus citations suggests that the compiler at least

⁵³ Bywater, followed by Regenbogen, also derives 57.10-58.29 from Theophrastus.

⁵⁴ Pitra (1852-8) vol. 3 lxxxii erroneously gives as the author Matthias Farinator, who was actually the editor of the printed editions.

⁵⁵ For a full account see Rouse and Rouse (1971); also L. Thorndike, *History of Magic and Experimental Science* vol. 3, New York: Columbia University Press, 1934, 548-551; C.R. Dodwell, *Theophilus: The Various Arts*, London: Nelson, 1961, xlv-liv.

⁵⁶ A list which appears at Pitra (1852-8) vol. 3 lxxxiv n., but attributed there to Simon Magister.

⁵⁷ In this connection, cf. our **267** and **727** no. 9.

had some awareness of the topics on which Theophrastus wrote, and that some of them rest on ancient, even if not Theophrastean, sources.⁵⁸ With some hesitation we have therefore included references to Theophrastus from the *Light of the Soul*, in accordance with our general principle of including all references to Theophrastus dating from before 1450.

The topic of a greater light overcoming a lesser, for which the *Light of the Soul* cites Theophrastus in our **287**, is linked with the explanation of dreams by Aristotle *On Dreams* 3 461a1, itself in turn used as a source by Priscian *Answers to Chosroes* 61.4; cf. also Antiphon (FVS 87B27) and the Commentary on **341** and below n. 65).

- 342** (Dubious report concerning Theophrastus) *Light of the Soul B*, ch. 56, *On Sleeping*, P (ed. 1477² Farinator)

The Aristotelian text *On Dreams* (Bekker pp. 458b-462a) follows immediately after *Concerning Sleep and Wakefulness* (Bekker pp. 453b-458a). If the reference here to ch. 5 of *Concerning Sleep and Wakefulness* has any substance at all, it may be that ch. 2 of *On Dreams* is counted as ch. 5 of the two works taken together.⁵⁹ It does not however contain an enumeration of seven causes of dreams. The title *Commentaries* appears in many of the references to Theophrastus in the *Light of the Soul* (cf. **727** 9a-b); whether it is intended to suggest commentaries by Theophrastus on works by others, or whether it is a general title like *hupomnēmata*, is uncertain. See below on **343**. For the connection between fatigue and one particular type of dream cf. Theophrastus, *On Tiredness* 16, cited above on **341**.

- 343** (Dubious report concerning Theophrastus) *Light of the Soul B*, ch. 72, *On Sleep*, F (ed. 1477² Farinator)

A striking statement, whatever its ultimate source. Discussion of dreams would be appropriate in connection with *phantasia* and hence in a discussion relating to book 3 of Aristotle's *On the Soul*, even if not a

⁵⁸ Cf. especially **287-9**, which are only comprehensible in the light of their common relation—whatever it may be—to Galen, *On the Use of the Parts* 10.3, and the discussions in Sharples (1984) and (1988,2). On the possibility of genuine confusion due to lack of clear demarcation between different works in the MSS cf. Dodwell, *op. cit.* l-iii.

⁵⁹ Cf., also in the *Parva Naturalia*, the treatment of *On Respiration* as part of *On Youth and Old Age*.

formal commentary; but while most of the references to Theophrastus' "Commentaries" in the *Light of the Soul* are concerned with topics considered in Aristotle's *On the Soul*, or at least with topics relating to the soul (cf. **448**), this does not apply to them all (cf. **168, 178, 180** and **190**). In any case, to separate the references in *Light of the Soul* that give an alleged Theophrastus book-title from those that do not may be a rather artificial proceeding, given the general unreliability of all these references.

- 344** (Dubious report concerning Theophrastus) *Light of the Soul B*, ch. 72, *On Sleep*, R (ed. 1477² Farinator)

This text as a whole is concerned with the explanation of dreams, and with the theory, in itself sounding remarkably modern, that dreaming in some way exercises the mind.⁶⁰ Theophrastus and "the Philosopher", presumably Aristotle, are cited for a general point about the effects of training; Theophrastus is said to have made this observation in a context concerned with the faculty of sensation, which could but need not imply that he himself employed it in the specific context of dreaming. Aristotle himself is cited rather in the context of education; but the alleged statements in the *Politics* and *Problems* are not in fact found there. "About the part (of the soul) concerned with sensation" should perhaps be treated as part of the title of the alleged Theophrastean work; cf. **267**.

LANGUOR, PARALYSIS, STRANGULATION, SNEEZING

- 345** Photius, *Library* 278 525b34-526a31 (*CB* vol. 8 p. 159.6-160.15 Henry) Regenbogen (1940) 1405.

Source

Photius (for whom see on **339**) compiled a collection of summaries of books that he had read. The present summary of Theophrastus' treatise *On Fainting* forms part of a sequence, constituting Photius'

⁶⁰ Cf. e.g. J.A. Hadfield, *Dreams and Nightmares*, Harmondsworth: Penguin, 1954, 65-75.

278th item, which is strange both in the selection of works and in their ordering.⁶¹ There is no apparent connection with the arrangement of Theophrastus' *opuscula* in the manuscript tradition as we have it or with other medieval references to them.⁶² The sequence of works summarised by Photius is as follows:

- On Creatures that Change Colour* (= **365A**)
- On Paralysis* (= **346**)
- On Fainting* (= **345**)
- On Vertigo* (= **328** no. 1; survives in MSS)
- On Tiredness* (= **328** no. 10; survives in MSS)
- On Creatures that Appear in Swarms* (= **359A**)
- On Creatures that are Said to be Grudging* (= **362A**)
- On Sweating* (= **328** no. 12; survives in MSS)
- On Honey* (= **435**)

Comparison of Photius' summaries with those texts that survive in MSS shows that he treats his material selectively, though the distribution of his extracts in terms of the original text varies in different works. He concentrates on the parts of Theophrastus' text that can be presented in the form of "problems", avoiding the more general and theoretical discussions.⁶³

The first of the texts in Photius' ordering, **365A**, opens—as items in Photius' collection regularly do—with "read (*anegnôsthê*) from the writings of Theophrastus", which the subsequent *hoti* ("that") and those in all the other texts take up; hence we have supplied "I read" here. Photius himself supplies Theophrastus' name in the heading to the

⁶¹ Huby (1986) 318 says that Photius found the text while visiting Assyria, but this is questionable; the reference to this visit in Photius' preface may relate to the circumstances that prompted the compilation of the *Library* rather than to the actual finding of the material. Cf. R. Henry, *Photius: Bibliothèque* vol. 1, CB 1959, xix-xx; Treadgold (1980) 16, 20-1. On the composition of Photius' collection and its date cf. in general Treadgold (1980); the group of Theophrastean texts are the penultimate item in the whole collection, and Treadgold argues that the latter part of the whole was written up by a secretary from Photius' notes.

⁶² Cf. Burnikel (1974) 131; Sharples (1988,1) 51. The "codices" into which Photius' collection is divided represent his records rather than the documents he studied, and sometimes cover more than one MS that he read, sometimes only a part of one (cf. Henry op. cit. xx n. 4, Treadgold [1980] 5); there seems no internal reason to doubt that his sequence of items from Theophrastus represents a single MS, but even if it is a selection from more than one the selection and the ordering of items still need to be explained.

⁶³ Cf. Burnikel (1974) 131-142; Sharples (1988,1) 52.

first two texts, **365A** and **346**, and it is clearly presupposed in the others. The repeated “that” at the start of each paragraph is simply an indication that Photius is taking notes; it does not necessarily indicate that material has been omitted and a fresh excerpt started.⁶⁴

Doctrine

The explanation given of fainting is essentially in terms of heat and cold; breath plays a less prominent part than in **346**. Fainting is explained by loss of heat, caused either by sudden cooling (as with loss of blood, line 13) or by greater heat overcoming our own internal heat.⁶⁵ In accordance with this,⁶⁶ fainting is caused (20ff.) not by the great heat during a bath but by the subsequent cooling of the moisture produced. At 24 it is suggested that fainting may be due to relaxation, or better release, of the breath as well as to the cooling of the moisture, but this is immediately explained by the claim that holding the breath keeps in the internal heat,⁶⁷ while releasing the breath allows the heat to escape.⁶⁸ Throwing water on those who faint benefits them by preventing what heat is left from escaping,

⁶⁴ Treadgold (1980) 44, citing T. Hägg, *Photius als Vermittler antiker Literatur*, Uppsala: Acta Universitatis Upsaliensis, Studia graeca Upsaliensia 8, 1975) 30-1.

⁶⁵ That a greater fire or greater heat extinguishes or overcomes a lesser one (line 4) is asserted also by Theophrastus *On Fire* 1, 10; Aristotle *On Coming-to-be and Passing-away* 1.7 323b8, *On Youth and Old Age* 5 469b32; [Aristotle] *Problems* 3.5 871a35, 3.23 874b5, 22.8 930b30, 24.13 937a26. Cf. Flashar (1962) 328 and 440, with further references. See also below on **427**. So too, but of light rather than heat, Theophrastus *On Sensation* 18, *On Fire* 11; Aristotle *On Dreams* 3 461a1; [Aristotle] *Problems* 31.28 960a24ff. See also the passages cited in the apparatus to **287**, and the discussions cited in n. 58 above. In the present passage the notion of greater heat overcoming lesser is coupled with the idea that our own internal heat requires cooling if it is not to be weakened (7); cf. Aristotle, *On Respiration* 8 474b19-24. At Aristotle, *On Sleep and Wakefulness* 3 457b14 ff., shivering when hot water is poured on one is connected with the idea that the heat from food concentrates cold in the upper parts and thus weakens the native heat.

⁶⁶ The statement at 17-19 that external heat causes fainting not only because it overcomes the internal heat, but also because it prevents breathing and does not allow what *cools* to enter, seems in conflict with the general theory; but perhaps the point is that fainting is caused by an imbalance either in the direction of heat or in that of cold. We are after all dealing with a summary, apparently a very condensed one.

⁶⁷ So too Theophrastus *On Fire* 15, described by Coutant (1971) 55 as a remedy still practised.

⁶⁸ However, *endidōsin* in 26 would better be taken as intransitive, “gives in” or “succumbs”.

and concentrating it (27-9).⁶⁹ At 30-33 fainting is again linked with moisture. For the effects of moisture and of chilling see **346**, though there breath plays a major role, and for those of chilling see also **347**, and **214A** 21-4 (above, n. 5). For the liquefaction (*suntêxis*) of matter in the body (22, 31 here), and for the connection with fatigue of moisture produced thereby, see above on **341**, with nn. 48 and 50.

346 Photius, *Library* 278 525b22-33 (*CB* vol. 8 p. 158.22-159.5 Henry)

Regenbogen (1940) 1405. Solmsen (1961) 182-3 = id. (1968) 567-8. Flashar (1962) 336, 428. D.E. Hahm, *The Origins of Stoic Cosmology*, Columbus: Ohio State University Press, 1977, 180 n. 58. L. Repici, *La natura e l'anima, saggi su Stratone di Lampsaco*, Turin: Tirrenia, 1988, 11 and n. 53. Annas (1992) 26.

On Photius' summaries of Theophrastean texts in general see above on **345**. As indicated there, the summaries, apart from the first, usually start after the title simply with *hoti* = "that", understood to mean "I read in Theophrastus that". Here instead we have "that he says that . . ."; this is probably just a more long-winded way of saying "I read that Theophrastus says that . . .". It *could* also indicate "I read in Theophrastus that (some other person, unspecified) says that . . .". But the omission of the person's name would be strange, and it would also be odd for Photius either to excerpt only the part of a Theophrastean text that gave the theory of someone other than Theophrastus, or to fail to indicate where the report of the third, unnamed person's views finishes and that of Theophrastus' views starts. Treadgold (1980) 44 argues generally that *hoti* in Photius should not be taken as indicating that Photius is himself dependent on another excerptor.

⁶⁹ Similarly Theophrastus *On Fire* 15 and [Aristotle] *Problems* 9.9; Regenbogen (1940) 1406, Furley (1983) 83. For cold concentrating heat cf. also **173**, **176**, and for the rendering of *antiperiustatai* by "is compressed" see the Commentary on **173** and on our vol. 1 Appendix 3; E.S. Forster, *Aristotle: Problemata*, Oxford: Clarendon Press, 1927, n. 2 on 2.16; H.D.P. Lee, *Aristotle: Meteorologica*, LCL 1952, 82-3; Flashar (1962) 369; Einarson and Link (1976-90) vol. 1 pp. 94-5 n.(a). Anonymus Londinensis XXXVIII 35ff. (*Suppl. Arist.* 3.1 pp. 72-3 Diels) argues that a cold shower before leaving the bath-house contracts the pores and prevents cold entering. The principle of cold concentrating heat is frequently used in *CP* (e.g. 1.12.3, 2.1.3, 2.6.1, 2.8.1, 2.9.8, 6.18.11); G.R. Thompson (1941) 255; Einarson and Link (1976-90) loc. cit.—Schneider (1818) vol. 4 799 argues that the *pneumatikos topos* of 32 is not the *anapneustikos topos*, "region where respiration occurs", of 3, but rather the places to which *pneuma* extends in the body as a whole, to answer Furlanus' objection that in joy spirit and blood spread out through the body; but 32 suggests that Theophrastus' point is that the moisture *once formed* moves towards the *pneumatikos topos*.

The structure of the argument as we have it is complex. A general theory (a) that paralysis is due to cooling is explained by some in terms of the view (b) that it⁷⁰ is due to breath,⁷¹ but by others in terms of the view (c) that it is due to interruption of breath.⁷² The way the text continues favours view (c), for it is said that it is when the breath is cut off by pressure that numbness occurs; but since the chilling that then takes place is due to the trapped breath, it is not so much a matter of the absence of breath as of the presence of unmoving breath. That the compression of blood-vessels in the neck causes fainting is noted by Aristotle *On Sleep* 2 455b6-8 (cf. Repici). [Aristotle] *Problems* 2.15 and 6.6 attribute numbness to cooling due to deprivation of blood, but do not mention breath, and are concerned rather with the question why hands and feet are particularly prone to numbness, explaining it by their being less fleshy and so cooling quickly. Hippocrates, *Sacred Disease* 7 explains numbness by interruption of breath which cannot move through veins. Paralysis is attributed to thick cold phlegm in the arteries, clearly stopping the *pneuma*, by Diocles and Praxagoras.⁷³

Solmsen sees the notion of breath in the blood-vessels in this passage as evidence of a shift away from Aristotle towards a *pneuma* theory. (Cf. also Roselli [1992] 81, by implication interpreting Aristotle, *MA* 703a11-16 as showing that the connate *pneuma* is situated *only* in the heart.) Peck (1942) 593 and Gerard Verbeke (in G.E.R. Lloyd and G.E.L. Owen, eds., *Aristotle on Mind and the Senses*, Cambridge: Cambridge University Press, 1978, 198) argue for the presence of connate *pneuma* in the blood throughout the veins in Aristotle too, the mechanism of sensation being explained thereby (cf. *GA* 744a3). Annas (1992) 18-19 argues that Aristotle had not fully distinguished explanation by *pneuma* from explanation by connate heat, and that Peck exaggerates the role of *pneuma*; Longrigg (1993) 173-4 that

⁷⁰ "It" is presumably "chilling" rather than just "paralysis".

⁷¹ In line 3 (to which the apparatus entry of the first printing should refer) Schneider, followed by Wimmer, conjectured "by breath <when it is chilled>"; Solmsen suggests rather "by breath <when it is interrupted>". The emendations make what is said here anticipate the eventual solution more clearly; on the other hand, the text as transmitted gives a more dialectical development, and we are dealing with an apparently very compressed summary.

⁷² With the connection between breath and heat here Annas compares that between fire and breath at Theophrastus *On Fire* 76.

⁷³ *Anecdota medica* 20 p. 550 Fuchs = Diocles fr. 57 in Wellmann (1901) = Praxagoras fr. 75 Steckerl. Cf. Solmsen (1968) 564; Longrigg (1993) 174-5.

Aristotle initially explained the transmission of sensation through the body by the blood, but subsequently gave this role to *pneuma*. There is in any case, as Solmsen points out, no suggestion in our passage, or in any of the genuine works of Aristotle, of the theory of Praxagoras and Erasistratus⁷⁴—that breath and blood are found in the arteries and the veins respectively.⁷⁵ Wehrli⁷⁶ suggests that for Strato soul-*pneuma* extended through the arteries, but does not indicate whether he thinks Strato placed *pneuma* and blood in the *same* vessels.

347A Athenaeus, *The Sophists at Dinner* 2.73 66EF (CB vol. 1 p. 164.10-12 Desrousseaux)

347B Oribasius, *Summary, to Eustathius* 8.59 (CMG vol. 6.3 p. 270.1-7 Raeder)

Schweighäuser (1801-7) vol. 1 447. Bussemaker and Daremberg, *Œuvres d'Oribase*, vol. 5, Paris: Imprimerie nationale, 1873, 460-1. Regenbogen (1940) 1405.

Athenaeus and Oribasius (the latter the 4th century A.D. physician of the emperor Julian) quote, with variations, the same passage from Theophrastus' *On Suffocation* (*Peri pnigmou*), though Oribasius continues at greater length; a phrase is also quoted by the grammarians Herodian (2nd century A.D.) and George Choeroboscus (early 6th century A.D.). (The transmitted text of Oribasius, though not of Paul of Aegina or of Aëtius Amidenus, has not *peperidos* "of pepper" but *pteridos* "of fern".) In **347B** "About those who are strangled" (*apanchomenoi*) is Oribasius' own heading stating the subject-matter, as in every section of his work; "from the (writings) of Theophrastus" is his sub-title, as it were, stating his source, which does not appear in every section.

Vivian Nutton notes that *kathimenôî*, translated "made to swallow" in **347B**, was understood thus by the Latin version of Oribasius, which has *iniciendi sunt*; he comments that the Greek word can itself be used in the sense of letting sediment settle, but an indication of how the remedy is to be administered is needed here. It is not clear

⁷⁴ Also of Diocles, according to Longrigg (1993) 174-5, and of [Aristotle] *On Breath* 5 483b15ff.; cf. Jaeger (1913) 61. More generally, for connate *pneuma* throughout the body in this treatise cf. 481b18-19, 482a33; Roselli (1992) 81.

⁷⁵ Cf. Annas (1992) 22 on the absence in Aristotle of anything like the centralised mechanism—a "nervous system", in a sense—of Praxagoras.

⁷⁶ Wehrli (1967-78), vol. 5 p. 73.

from the Greek of **347A** and **347B** whether “seed” is to be taken with “pepper” as well as with “nettle”, but it gives a better sense to take it thus; in any case the remedy involves either vinegar and pepper or vinegar and nettle, and that the pepper as well as the nettle would need to be pounded or ground seems *prima facie* likely. The grammarians Herodian and Georgius Choeroboscus cite Theophrastus explicitly for the genitive *peperidos*, which is the form in Athenaeus and Oribasius too; at *HP* 9.20.2, however, it is the alternative form *peperios* that is found.

The thought, as **347B** makes clear, is that these hot substances will reverse the process of chilling; cf. **345** and **346**. Just before **347A** Athenaeus has cited *HP* 9.20.1 (= **413** no. 114) for the heating effect of pepper as an antidote to hemlock.⁷⁷ Because of this, indeed, Schweighäuser suggested that the reference in **347A** as well might be to a remedy for the suffocating effect of hemlock-poisoning, noting also that pepper and nettle-seed appear as a remedy for this at Nicander *Antidotes* 201. But there is no hint of a reference to hemlock in the Oribasius passage, and the use of *apanchesthai* suggests that the reference is more general.⁷⁸

348 Pliny, *Natural History* 28.57 (*CB* vol. 28 p. 39.9 Ernout)

Regenbogen (1940) 1540. Flashar (1962) 745.

Regenbogen notes the parallel with [Aristotle] *Problems* 33.12, where two explanations are given for the alleged difficulty of the old in sneezing; either the ducts through which breath passes have become partially closed, or they raise up their breath with greater difficulty and then expel it more violently downwards. Regenbogen suggested that both Pliny and [Aristotle] derived their material from Theophrastus' *Problems* (**727** no. 3 or 4); Flashar however notes that it is also possible that Pliny has mistakenly attributed the [Aristotle] reference to Theophrastus.

⁷⁷ Scarborough (1978) 381, however, suggests the effect might actually be achieved through causing vomiting.

⁷⁸ I am grateful to Vivian Nutton for discussion of this text.

MEDICINES

349 Hesychius,⁷⁹ *Lexicon*, on *kollura* (no. 3349, vol. 2 p. 502.18-19 Latte)

The text is corrupt. *kollura* is used for medical preparations, and especially for eye-ointment (more often *kollurion*) in which the ground-up ashes of burnt ingredients were frequently included.⁸⁰ Latte may have been prompted to introduce the plant alkanet⁸¹ in his emendation by the fact that alkanet and papyrus ash appear as additives for colouring wax at Pliny 21.85.⁸² Dr Nutton, to whom I am grateful for advice on this text, suggests that the correct reading might be *hê eu helkousa*, "that which draws out well", or that the corrupt text might conceal a reference to *helkos* "a sore".

⁷⁹ Of Alexandria: fifth century A.D.

⁸⁰ Cf. H. Nielsen, *Ancient ophthalmological agents*, Odense: Odense University Press, 1974, 13-15.

⁸¹ *enchousa*, the Attic form for *anchousa*; *Alkanna lehmannii* Tineo, *Alkanna tinctoria* Tausch; cf. Mabberley (1987) 18 and J. André on Pliny 21.85 (CB 1969).

⁸² Cf. also Pliny 21.99, where alkanet is used for dying wood and wax.

LIVING CREATURES⁸³

350-383 Joachim (1892). Regnbogen (1940) 1423-1434. Kroll (1942). Wehrli (1983) 506-7. Huby (1986). (See also the detailed bibliographies below.)

OVERVIEW: SOURCES

Theophrastus' study of animals is an area in which our assessment of his achievement is doubly affected by the nature of our sources. First, those sources tend to report observations rather than theoretical discussions, and this makes it difficult to determine the reasons for Theophrastus' interest in a particular topic. Both generally and because of the nature of many of our sources, it often seems to be curiosity value more than anything else that determines which items are reported.⁸⁴ It is true that we have one zoological work, *On Fish* (cf. **363**) surviving in MSS, and summaries by Photius of three more (**359A**, **362A**, **365A**), and that in each of these cases we can to some extent discover the questions and issues that the work raised. But even in the case of Aristotle's extant *HA* the purpose and theoretical presuppositions of the work have not been immediately apparent to scholars, as is shown by the history and extent of modern

⁸³ The rendering "living creatures" for *zôia* requires some explanation. The Greek word covers both human beings and other living creatures; it would be odd to use "animals" in that way in English. Moreover, *zôia* includes creatures such as fish, which are "animals" in the broad sense in English where that term is contrasted with "vegetable" and "mineral", but are contrasted with "animals" in the narrower sense of the term where it relates to land creatures. For both reasons the broader term "living creatures" sometimes seems the desirable rendering; but on occasion, when no awkwardness is involved and when it would be cumbersome to do otherwise, we have used the simpler "animals". "Living creatures" does not include plants; these are indeed possessed of *psuchê* for Aristotle (though not for the Stoics), but they are not properly speaking *zôia*. (For the contrast between plants and *zôia* cf. Aristotle *On the Soul* 1.5 410b23-4, 411b29, *On Youth and Old Age* 1 467b24, *Parts of Animals* 4.5 681a10-15, *Generation of Animals* 2.5 741a9.)

⁸⁴ See below, n. 122. It was moreover valuable to the paradoxographical tradition to be able to give reports the authority attaching to the names of famous naturalists such as Aristotle—and Theophrastus; on the use of Aristotle's name in this way by Antigonos and by Pliny cf. James S. Romm, 'Aristotle's elephant and the myth of Alexander's scientific patronage', *American Journal of Philology* 110 (1989) 566-575, at 570.

discussion of the work; with the isolated scraps that are all we have of Theophrastus' zoological writings the problem is even greater.

The second problem that the sources present is that of disentangling what is Theophrastus and what Aristotle. It was sometimes uncertain to which of the two writers a particular work was to be attributed,⁸⁵ and subsequent compilations added further material; whether in the context of a working research library or in that of encyclopaedic collections, there was more interest in the information itself than in its precise origins.

A particular complex of problems, and one that concerns us directly here, relates to *HA* 8 and 9. The authenticity of *HA* 7-10 has often been questioned, though also defended, most recently by Balme (1991) 1-30. There are close affinities between passages in *HA* 8 and 9 and works of Theophrastus which are lost but known from secondary sources; and there are also close affinities with the pseudo-Aristotle *Mirabilia*, which is clearly a derivative work, excerpting its source-material with the emphasis that its title would suggest.⁸⁶ But there are also significant differences between *HA* 8 and 9 and the Theophrastean material, and passages present in the latter that are not present in the former. Some have suggested that *HA* 8⁸⁷ and 9⁸⁸ are based on Theophrastus or even that 9 is in fact identical with a Theophrastean work whose title is known to us.⁸⁹ Balme, who argued that *HA* 8-9 were by Aristotle, regards Theophrastus in his zoological works as continuing and developing the enquiries of these books;⁹⁰ Huby regards *HA* 8-9 as compilations based on some of the Theophrastean material but antedating other parts of it.⁹¹

The paradoxographer Antigonos of Carystus (c. 240 B.C.) attributes to Aristotle material concerning animals which other sources assign

⁸⁵ Cf. for example *On Metals* (above, **137** no. 20b); and below on **389**. In general see Regenbogen (1940) 1424.

⁸⁶ On the *Mirabilia* cf. Joachim (1892) 13-25; Giannini (1964) 133-5; Flashar (1972); Fraser (1972) vol. 2 771.

⁸⁷ Dittmeyer (1907) 345 and 349 argues that *HA* 8.28 and 8.29 607a9-20 are based on the Theophrastean *On Differences According to Place*, *HA* 8.29 607a20ff. on Theophrastus' *On Creatures that Bite and Sting*; cf. below on **355-8** and on **360-1**. Dirlmeier (1937) 56-60 attributed *HA* 8.1 to Theophrastus.

⁸⁸ L. Dittmeyer, 'Die Unechtheit des IX. Buches der aristotelischen Tiergeschichte', *Blätter für das bayerische Gymnasialschulwesen* 23 (1887); Joachim (1892) 10-11; Dittmeyer (1907) vii; Flashar (1972) 42-4.

⁸⁹ Regenbogen (1940) 1434; see below on **350** no. 11.

⁹⁰ Balme (1991) 8-9.

⁹¹ Huby (1986) 316-17, 323. Cf. also below on **350** no. 11, **365**, and **366-70**.

to Theophrastus. Some of this material, but not all, is indeed found in the *HA*—but in some cases in the disputed *HA* 9.⁹² As Regenbogen noted, Theophrastus is cited in the later part of Antigonus' collection (129-173), which derives from Callimachus, but not elsewhere in the work.⁹³ From this Regenbogen concluded that a clear distinction was made between the writings of Theophrastus and Aristotle in Alexandria, where Callimachus was working, but not in Athens. It may however be that what Antigonus was using was not a Theophrastean work misattributed to Aristotle, but a compilation which already combined Aristotelian and Theophrastean material.⁹⁴

That such compilations existed and were extensively used is shown by the way in which Aristotle himself is cited by later ancient sources. Athenaeus (c.200 A.D.) cites, as from Aristotle, sequences in which passages from different books of the *HA* as we have it are combined with others which are not found in it at all.⁹⁵ The natural explanation is that he is using a source in which material from different parts of *HA* has been combined with material from elsewhere.⁹⁶

Three probably distinct collections deserve discussion here. They are the *Summary* by Aristophanes of Byzantium; the Aristotelian *Anatomai* or *Dissections*; and "Aristotle's *Ζῷκα*". The existence of these compilations reflects two motives; first, to present descriptive material conveniently arranged by different types of creature,⁹⁷ as it is not in the *HA* with its more theoretical concerns,⁹⁸ still less in works like

⁹² Antigonus 20, 25. Cf. **362A** 2-8, **365A**; Rose (1863) 278-9, (1886) 252; Regenbogen (1940) 1370; Huby (1986) 314. The description of *hippomanes* in Antigonus 20 is closer to *HA* 6.22 577a7-13 than to *ibid.* 8.24 605a2-4, but shares the verb *apesthiein* not only with the former but also with **362A** 5-6; the description of the chameleon in Antigonus 25 echoes *HA* 2.11, but for this chapter see below on **365**. See also below, n. 94; and on Antigonus in general cf. Giannini (1964) 112-16; Fraser (1972) vol. 2 770.

⁹³ Regenbogen (1940) 1371; cf. Flashar (1972) 53, and **196B**, **209** no. 3, **213B**.

⁹⁴ So Balme (1991) 6 following Kroll (1942) 5. Giannini (1964) 114-115 and n. 98 points out that Antigonus 26-60 derive from *HA* 9 specifically, 60-115 from *HA* as a whole (*ibid.* 114), so that the citations of Aristotle in 1-25, including those in 20 and 25, seem likely to come from a source distinct from our *HA*.

⁹⁵ E.g. Athenaeus 9.394; Balme (1991) 5. For Athenaeus see further below on **384-435**: Sources.

⁹⁶ Regenbogen (1940) 1430-2; cf. also Rose (1863) 276-283. Balme (1991) 5 comments "It certainly seems that some kind of handbook—possibly more than one—existed already in the third century B.C., and that readers used it rather than the original treatises, either because the latter were not available or because they were too difficult to use." See below, on **368**.

⁹⁷ So, of the *Ζῷκα*, Kroll (1942) 29.

⁹⁸ On which cf. Gotthelf (1988).

Aristotle's *Parts of Animals*; and second, to incorporate new observations—which could include Theophrastean material. But the latter motive may have applied more to the *Ζῷκα*, if it developed in an essentially scientific context, whereas the motivation of a writer like Aristophanes of Byzantium was lexicographical and literary.⁹⁹

- (i) Material about different types of animals was excerpted from Aristotle by Aristophanes of Byzantium (c.257-180 B.C.), head of the library at Alexandria. Aristophanes' original work is now lost, but it was one of the sources utilised by the rhetorician and writer Aelian, in the early third century A.D., in his collection of remarkable stories about animals. Aelian however knew it not directly but via the literary scholar Didymus Chalcenterus (1st century B.C.) and the compiler Pamphilus (1st century A.D.).¹⁰⁰ In the 10th century A.D. the emperor Constantine Porphyrogenitus made, or rather had made for him by a scholar whose name does not survive,¹⁰¹ a compendium which combined material from Aristophanes' work with that from other writers including Aelian.¹⁰²

The full title in the MS of Constantine's compilation, as given in Lambros (1885), runs:

Collection (*sullogê*) of research (*historia*) on living creatures on land, with wings and in the sea, a labour of love by Constantine the great king and emperor:

- (subtitle) Aristophanes' Summary (*Epitomê*) of the (writings) of Aristotle on living creatures,¹⁰³ with what was said by Aelian and Timotheus and certain others about each creature subjoined to it.

⁹⁹ Cf. Kroll (1942) 30.

¹⁰⁰ Rose (1863) 282; Wellmann (1916), modifying his earlier views in his (1891), cf. Kroll (1942) 26; Regenbogen (1940) 1424; Scholfield (1958-9) vol. 1 xv-xvi. Aelian however used other sources too, notably Alexander of Myndus (Wellmann [1891]), who in turn had used Aristophanes of Byzantium, the *HA* and the *Ζῷκα* (Düring [1950] 62); Plutarch *On the Intelligence of Animals*; and Oppian's *On Fishing*. Cf. R. Keydell, 'Oppians Gedicht von der Fischerei und Aelians Tiergeschichte', *Hermes* 72 (1937) 41ff.; Scholfield (1958-9) vol. 1 xvi-xxiv. On Pamphilus see further below, on **383** and on **384-435**: Sources.

¹⁰¹ Lambros (1885) p. xvii.

¹⁰² Constantine's excerptor in fact used two versions of Aelian, a full one and an epitome already contaminated with material from Timothy of Gaza; Lambros (1885) ix-xii.

¹⁰³ Aristophanes' work was referred to as *tôn Aristotelous peri zôion epitomê*, "sum-

We have therefore cited the compilation not as "Aristophanes", but, since it reflects a plurality of sources, as Constantine Porphyrogenitus' *Summary*.¹⁰⁴

- (ii) Apuleius¹⁰⁵ cites Aristotle's *Anatomai*, a title which appears in Diogenes Laertius' list of Aristotelian titles¹⁰⁶ and indeed in cross-references in Aristotle's own works.¹⁰⁷ Apollonius the paradoxographer (2nd century B.C.) also refers to Aristotle's "selection of *Anatomai*".¹⁰⁸
- (iii) Apollonius and Athenaeus refer to "Aristotle's *Ζῷκα*" as something different from the *HA*.¹⁰⁹

Various theories have been held concerning the relation between these works. The material Apollonius cites explicitly as from the *Ζῷκα* actually appears in Aristophanes' summary, or rather in Constantine's compendium of it, but in an abridged form.¹¹⁰ Rose, followed by de Stefani and Wellmann, therefore identified the *Ζῷκα* with Aristophanes' summary,¹¹¹ but Kroll argued rather that Aristophanes too used the *Ζῷκα* as a source.¹¹² Regenbogen suggested that Athenaeus used Aristophanes' summary, while allowing that there may have been an intermediate compilation used, rather than the *HA* itself, both by Aristo-

mary of Aristotle's (works) on living creatures", by John Lydus, who is sixth century A.D. and so considerably earlier than Constantine Porphyrogenitus (cf. Slater [1968] 141ff.). *Historiae animalium epitome* is the title Lambros gives to Aristophanes' own work, but *historia* is not part of Aristophanes' title as given in Constantine's sub-title; it seems that Lambros has taken it from Constantine's *own* title. Cf. also Praechter (1909) ad fin.

¹⁰⁴ The term *sullogê* does not perhaps in itself imply that Constantine shortened Aristophanes' work (though Caston's English version of Praechter [1909] renders it by "summary"; Praechter himself left the Greek untranslated); but Lambros on his title page renders *sullogê* by *Excerpta*, and what is included from Aelian is certainly a collection of (re-arranged) extracts.

¹⁰⁵ *Self-Defence* 36, 40.

¹⁰⁶ Diogenes Laertius 5.25.

¹⁰⁷ H. Bonitz, *Index Aristotelicus*² (curavit O. Gigon), Berlin: De Gruyter, 1961, 104a4-14; cf. Moraux (1951) 108, 318 and Longrigg (1993) 149 and 161-2, the latter however suggesting that Aristotle may be referring to a work by Diocles.

¹⁰⁸ Apollonius 39.

¹⁰⁹ Apollonius 27; Athenaeus 7.315e.

¹¹⁰ Apollonius 27 = Constantine Porphyrogenitus, *Summary* 1.112 p. 31.5-6 (from Aristophanes of Byzantium, Lambros [1885] p.xvi). Cf. also Keaney (1963) 57.

¹¹¹ E.L. De Stefani, 'Per L'Epitome Aristotelis de Animalibus di Aristofane di Bizanzio', *Studi Italiani di filosofia classica* 12 (1904) 421-45; Wellmann (1916) 8.

¹¹² Kroll (1942) 28-30. Cf. also During (1950) 55-7.

phanes himself and by Apollonius.¹¹³ Rose argued that *Anatōmai* and *Ζῷκα* were alternative titles for the same collection of material later than Aristotle himself;¹¹⁴ but Regenbogen argued more plausibly that the *Anatōmai* were not identical with the *Ζῷκα* but were one of the classes of material incorporated into it. There seems however to be a closer link between the *Anatōmai* and Aristophanes' summary than between either of these and the *Ζῷκα*. For Kroll argued that for Pliny Aristotle on zoology meant the *Ζῷκα* rather than our *HA*; but Pliny does not include the type of anatomical description which is frequent in Constantine's compendium and does not derive from the *HA*.¹¹⁵

Apart from the authors so far mentioned who used Theophrastean material on zoology directly or indirectly, mention should be made of Plutarch, who refers to Theophrastus in connection with animal intelligence (cf. **365CD**) and shows some knowledge of the content of at least one of his treatises (**362H**); Philo Judaeus, who seems to have had direct or indirect knowledge of another (see below on **365A-D**, and compare **184**); and Albertus Magnus, for whom see below on **376-9**.

Since our collection of texts and translations is of passages where Theophrastus is named, it does not include every item related to his lost zoological works by modern scholars; and given our policy on inclusion of context material, the extent to which we have included material that may be Theophrastean but is not attributed to him by name depends in part on the habits of the authors from which our texts come.¹¹⁶ In this present Commentary volume, however, mention of passages connected with Theophrastus by modern scholars inclines to inclusiveness rather than exclusiveness; though the reader should be warned that some of the discussions here cited, and above all those of Joachim, display the extreme speculativeness characteristic of classic late nineteenth-century *Quellenforschung*, and that some of their attributions are mentioned here more for bibliographical completeness than with the intention of endorsing them.

¹¹³ Düring (1950) 63 argues that Athenaeus used the *Ζῷκα* directly and not only through Aristophanes of Byzantium.

¹¹⁴ Cf. Rose [1863] 276-7, 312-13, 710-11. So also Düring (1950) 64.

¹¹⁵ Cf. Lambros (1885) xiv-xv; Kroll (1942) 29; Düring (1950) 55-7.

¹¹⁶ For Pliny's procedure in this regard cf. e.g. 8.104 (see below on **359C**); also 8.134-7 (below, at n. 219); Kroll (1942) 9 and n. 1. And on Pliny's methods of sorting his material cf. André (1955) 313-17; R.C.A. Rottländer, 'The Pliny Translation Group', in French and Greenaway (1986) 11-19; A. Locher, 'The Structure of Pliny the Elder's *Natural History*', *ibid.* 20-29.

A further problem is that of how far Theophrastean material cited by a secondary source in a single context can be supposed to have come from a single Theophrastean work. Clearly sometimes a secondary source will have brought together references to a single creature from different Theophrastean works.¹¹⁷ But there are also cases where the explanation may rather be Theophrastus' habit of repeating similar observations in more than one work.¹¹⁸

OVERVIEW: DOCTRINE

The titles of Theophrastus' zoological writings, and the surviving reports of his work in this area, suggest an interest in aspects of living creatures other than their anatomical structure. Theophrastus does not seem to have pursued the topics of Aristotle's *Parts of Animals* (though he did discuss questions of teleological explanation in zoology in another context).¹¹⁹ There is some concern with the generation of living creatures in general (though many of the references here are late or otherwise dubious) and with spontaneous generation in particular. But Theophrastus' interest was for the most part rather in animal behaviour and the reasons for it.¹²⁰ He discusses questions of hibernation, habitat, and ecology; and the works on variations in sound, some of which are attributed to environment, and on fish on, or in, dry land can be linked to these general concerns. (They can also be seen as developing Aristotle's own interest in biological explanation by what is functional in a particular environment; cf. Lennox [1987,2], 353-8.) Typical of Theophrastus is the presence of different explanations and the attempt to distinguish where they are applicable;¹²¹ typical too is the noting of alleged phenomena as "strange" or "paradoxical" with the positive intention of incorporating them into his theory.¹²² The treatise on poisonous creatures, investigating

¹¹⁷ As has explicitly been done by Athenaeus (or his source) in **365B** and **369**.

¹¹⁸ Cf. below on **355A**, **360-1**, **362A**, **362D**, **362F-G**, **363** no. 2, **366-70**. Joachim 23-4; Sharples (1988) 41-5.

¹¹⁹ Theophrastus, *Metaphysics* 9 10a22ff. On this cf. Lennox (1985); Most (1988); Repici (1990).

¹²⁰ Cf. Kraak (1953) 411. Eudemus too was interested in animal behaviour, if his fr. 126-132 Wehrli are authentic; cf. Wehrli vol. 8² (1969) 112-13.

¹²¹ Cf. **359A** and the distinctions between different types of "fish out of water" in *On Fish* (**363**), especially the listing in §12 of that work. Cf. Lennox (1987,2), especially 110-11 on the different ways of drawing the distinction between land- and water-dwellers indicated by *PA* 3.6; and more generally Kidd (1992).

¹²² This applies to Theophrastus' work in the "intractable" fields of sublunary

the working of their poisons, connects both with Theophrastus' physiological interests and with the discussions of poisonous waters in *On Waters*.¹²³

Theophrastus' interest in animal behaviour raises the question of how far he saw animal behaviour as analogous, or more than analogous, to human behaviour.¹²⁴ Fortenbaugh has argued that in Aristotle there are two conflicting attitudes to this question; generally it is the difference between rational human beings and non-rational animals that is stressed, but occasional passages suggest analogies between human and animal emotions and capacities for understanding.¹²⁵ Theophrastus has been seen as emphasising the links between human beings and animals rather than the differences, though opinions vary, here as in other areas of Theophrastus' work, over how far this should be seen as deliberate divergence from Aristotle on Theophrastus' part.¹²⁶

physics as well as in biology. See Lloyd (1983) 119-135, especially 133; Vallance (1988); Sharples (1992,2) 358; Battagazzore (1993), especially 212-22. It also serves to explain the particular emphasis on the paradoxical we find in subsequent sources who excerpt Theophrastus without also taking over his theoretical interests (above, nn. 84, 86)—whether we suppose that Theophrastus' writings were simply amenable to such an interest in the remarkable, or rather that they actually helped to stimulate it.

¹²³ Cf. 213, 214A; Steinmetz (1964) 258-60.

¹²⁴ On the part played in ancient ethics at various periods by discussion of animals other than human beings, and Theophrastus' place in that development, cf. R. Walzer, *Greek into Arabic*, Oxford: Cassirer, 1962, 152-3 (I am grateful to Vivian Nutton for this reference); also Sorabji (1993).

¹²⁵ Fortenbaugh (1971), (1974) 63-70; Cole (1992) 46-51. One aspect of the question that has provoked particular controversy is whether Aristotle, who in the *Nicomachean Ethics* at least allows that the actions of children and animals can be *hekousia* (for at 1111a25-6 the suggestion that this might not be so is clearly treated as untenable), either restricts or should have restricted *responsible* action to those who have the power of reason; cf. T.H. Irwin, 'Reason and Responsibility in Aristotle', in A.O. Rorty (ed.), *Essays on Aristotle's Ethics*, Berkeley 1980, 117-155, at 124-6 and 133; M.C. Nussbaum, 'The "common explanation" of animal motion', in P. Moraux and J. Wiesner (eds.), *Zweifelhaftes im Corpus Aristotelicum*, Berlin: De Gruyter, 1983 (*Akten des 9. Symposium Aristotelicum*), 116-156, at 150-4, and *The Fragility of Goodness*, Cambridge: Cambridge University Press, 1986, 283-8; P.L. Donini, 'Volontarietà di vizio e virtù (Aristot. *Eth. Nic.* III.1-7)', in *Etica, Politica, Retorica: Studi su Aristotele e la sua presenza nell'età moderna*, a cura di E. Berti e Linda M. Napolitano Valditara, L'Aquila: Japadre, 1989, 3-21, at 4-6. It is noteworthy that while the *Eudemian Ethics* does not allow animal behaviour to be voluntary (2.8 1224a5ff., 2.9 1225a37ff.), it draws an analogy between human and animal friendship (7.5 1239b19, 1239b40) where the *Nicomachean Ethics* does not; Cole (1992) 48 and n. 8. This may serve further to illustrate the complexity of the question; analogy may happily accompany contrast, and may even imply it.

¹²⁶ Cf. Brink (1956) at 130-1; Fortenbaugh (1971) 151-7; Cole (1992) 52, 61; Sorabji (1993). Cole's remark deserves quotation: "This kind of difference of emphasis could be found even between two thinkers who shared *all* substantive beliefs about the

In **531** §3 Theophrastus suggests that all living creatures have souls *with the same principles*.¹²⁷ *HA* 8.1 588a24 refers to animals other than man as possessing, in some cases, something *akin* to sagacity.¹²⁸ **531** seems at first to go beyond this; but the claim that the principles of animal and human souls are the same, which implies that the terms in which animal and human life and activities are to be explained are fundamentally the same, does not exclude the way in which these principles are expressed being very different at different levels of the *scala naturae*. And the reference here to the “calculations” of animals need not perhaps imply anything more than something in animals *akin* to human reason.¹²⁹

This has a particular bearing on the interpretation of two of the zoological works of Theophrastus about which we do have considerable information. In *On Creatures Said to be Grudging* the claim that various types of animal behaviour are motivated by jealousy or grudgingness towards human beings is rejected (**362**). This might seem

extent of animal intelligence” (her emphasis). She argues (52) that at the very beginning of *HP* Theophrastus describes animals, by contrast with plants, as possessing both characters (*êthê*) and actions (*praxeis*) whereas Aristotle denies them the latter (*Eth. Nic.* 6.2 1139a19-20). But *HA* 1.1 487a10 and ff., in a context closely parallel to that in *HP* (as Gotthelf [1988] has argued; see especially 114), refers to the differences between animals in their ways of life (*bioi*), *praxeis*, *êthê* and parts. *praxis* clearly here has less than its full sense when applied to humans; but it is the similarity between the use of *praxeis* in the *HA* and *HP* passages that is significant in comparing Theophrastus’ and Aristotle’s views. (I am grateful to Allan Gotthelf for pointing this out to me.) For *praxeis* used of animals see also *HA* 8.1 588a17, 588b23, 27 (of the faculties shared by animal and plants), 8.12 596b20, 9.49 631b5; *PA* 1.5 645b16, 21, 28-35, 2.1 646b15, 647a23, 2.10 656a2 (again, of plants), 4.7 683b7.

¹²⁷ Fortenbaugh (1984) 129, cf. 274-285; Cole (1992) 54-5, who notes that at *Nicomachean Ethics* 8.11 1161a32-b3 Aristotle—in a different context, to be sure—denied that human beings and animals have anything in common. Also relevant to attitudes to animals in Theophrastus is **584A**.

¹²⁸ I owe the reference to Professor Sorabji. Cf. Fortenbaugh (1971) 151-5, (1975) 67-9; Balme (1991) 7-8.

¹²⁹ In **531** §4 there is a more explicit reference to animals other than human beings possessing intelligence; but whether Porphyry is still drawing on Theophrastus in §4 has been questioned (see Fortenbaugh (1984) and references there). Joachim (1892) 12-13 and Fortenbaugh (1971) 153 argue that Strato allowed intellect, *nous*, to animals: he certainly spoke of intellect as indispensable to perception in fr.112 Wehrli = Plutarch *On the Intelligence of Animals* 3 961a (cf. also fr.109 Wehrli = Sextus Empiricus *Against the Logicians* 1.350). But the inference that animals other than man must therefore have intellect may be Plutarch’s own rather than Strato’s; and the explicit assertion that for Strato animals have intellect in fr. 117 (= fr. 48) Wehrli = our **162** 10-11 = Epiphanius *On Faith* 9.37 (*DG* p. 592.17-18) is from an unreliable source. Eudemus is cited by Aelian 4.53 (= fr. 130 Wehrli) as saying that animals lack reason (are *alogoi*) but can calculate numbers.

surprising; but the assertion of connections between human beings and animals need not commit Theophrastus to the absurdity of explaining all animal behaviour in anthropomorphic terms as if there were no difference between human beings and animals at all.¹³⁰ In *On Creatures that Change Colour* (365) there is an apparent conflict in our secondary sources over whether the change of colour of the octopus is due to a passive physiological reaction of fear, or whether it is a protective device; but the answer may simply be that it is *both*. A distinction between involuntary reaction and deliberate self-protection might be appropriate in discussing human behaviour; it does not necessarily follow that it is relevant to draw it in the case of the octopus. The “principles” both of involuntary reaction and of protective behaviour may be common to human being and octopus, without it following that they are as clearly distinct in the latter as in the former.

350 List of Titles Referring to Zoological Works

1 *On Living Creatures*

Rose (1854) 47, 87, (1863) 278, (1886) pp. 251-2. Usener (1858) 14. Joachim (1892) 6-13. Regenbogen (1940) 1364, 1424-6, 1429-30. Kroll (1942) 5. Keaney (1968) 298 n. 2. Wehrli (1983) 485-6. Huby (1986) 317-18. Lord (1986) 155-6 and n. 44. Amigues (1988) viii n. 4. Sollenberger (1988) 19.

It is questionable whether the seven books assigned to no. 1 by Diogenes are to be identified, as the majority of scholars have supposed,¹³¹ with 350 nos. 3 and 5-10 below, which immediately precede no. 1

¹³⁰ In fact the explanation that Theophrastus rejects in 362 goes even further than this, for it involves not just treating animals as behaving in a grudging fashion towards other members of their own species, as one human being might be grudging towards another, but actually supposing that it is hostility *to human beings* that motivates the animals (as is pointed out by Cole [1992] 58). See further below on 362. There is no conflict here with Theophrastus' information on the amorous feelings of animals towards human beings (567-8: cf. HA 9.48 631a10; Joachim (1892) 46, Regenbogen (1940) 1432-4, Cole 57 n. 17); for there is no hint in those texts that the animals valued the human beings for their specifically human qualities (not even in 568B 5-6, which may simply be stating the fact as surprising rather than making any comment about motive.)

¹³¹ Lord (1986), in the context of his general claim that Diogenes' list of

in the first section of Diogenes' list of titles,¹³² and clearly form a group concerned with living creatures, being placed together even though the actual word "living creatures" is not explicit in all of them and the alphabetic ordering of the list is thus formally broken.¹³³

Against the identification is the fact that the actual citations of Theophrastus *On Living Creatures* in ancient sources (**371**, **380**) do not correspond to the sequence of seven titles in Diogenes as far as the book-numbers given are concerned, and in the case of **371** at least do not correspond in subject-matter either.¹³⁴ On the other hand, Athenaeus in **363** no. 2 *may* imply a reference to **350** no. 8 as the fifth book of *On Living Creatures*, and this *would* correspond with Diogenes' ordering, as Joachim 6 points out. It is possible that **350** no. 1 in Diogenes' list could correspond to **350** nos. 3 and 5-10 while **371** and **380** come not from the work thus constituted but from some other collection referred to by the same title; see below on those texts.

The reference to *On Living Creatures* in Diogenes Laertius 5.50 may simply be a doublet; see below on **384** no. 4, and cf. **137** no. 3.

2 *Epitome of Aristotle's On Living Creatures*

Rose (1854) 87. Regenbogen (1940) 1430. Lord (1986) 154.

The title could also be rendered *Epitome of Aristotle on Living Creatures*. This entry appears in the *third* section of Diogenes' list of Theophrastus' works (5.49). Regenbogen suggested that the six books corresponded to the first six books of the *HA*.¹³⁵ Cf. also below n. 355.

Theophrastean titles includes what are in fact Aristotelian works known to us as such, suggests that if *On Living Creatures* here is *not* identical with **350** 3 and 5-10, it might comprise Aristotle *Progression of Animals*, *On the Soul*, *Parva Naturalia* (in two books), and *Motion of Animals*.

¹³² The title *On living creatures* appears again in Diogenes' list as the last of seven items apparently added out of sequence at the end of the *fourth* section, the last three without any indication of the number of books in each case.

¹³³ A series of works relating to Democritus are grouped together similarly: **137** nos. 33-8.

¹³⁴ **371** would then have to come from *On Creatures that Bite and Sting*. Joachim (1892) 6; Regenbogen (1940) 1429. Theophrastus, *On Animals* is also cited by Albert the Great in **377** below.

¹³⁵ Lord (1986) claims that this *Epitome* in fact is *HA* 1-6; see above on **350** no. 1.

3 *On Differences of Voice in Creatures of the Same Kind*4 *On Differences with Regard to Locality*

Rose (1863) 327-332. Joachim (1892) 8-9. Regenbogen (1940) 1426. Huby (1986) 318, 322.

350 no. 3 appears in Diogenes' list and is cited by Athenaeus; no. 4 does not appear in Diogenes' list but is cited by Athenaeus. The question arises whether we are dealing with two independent works (as Joachim argued),¹³⁶ or whether no. 3 was a section of no. 4 (so Rose and Regenbogen). There does not seem to be any evidence for Theophrastus' having discussed differences of sound other than those linked to local variation, and the sources suggest that he considered the two topics in the same contexts (cf. **355A** §§37-8 and **355C**), though this could be due to the rearrangement of material by our sources, and if discussion of sound was intermingled with that of other types of difference throughout the work it is difficult to see why the separate title no. 3 should have developed.¹³⁷

See further below on **350** no. 12, **355-8**, **362D**, **363** no. 2, **365**; and compare **139** 40 and the Commentary there.

5 *On Creatures that Appear in Swarms: On Creatures Produced Spontaneously*

Rose (1863) 333-337. Joachim (1892) 8, 10, 47-9. Regenbogen (1940) 1426-7, 1445. Balme (1962) 104. Huby (1986) 318.

Titles 5a and 5b are simple variants in the first section of Diogenes' list and in Photius' summary; 5c occurs in the second section of Diogenes' list and out of alphabetical sequence, as Huby notes. 5c was held by Rose to refer to the same work as 5a and 5b; Joachim and Huby disagree.¹³⁸ The text as summarised by Photius in **359A** is not confined to discussion of creatures generated spontaneously;

¹³⁶ Joachim (1892) argues that the only texts to be traced to no. 3 rather than to no. 4 are **355A** §35, **355B**, and Antigonius 6 (cited on **355B**).

¹³⁷ A further complication is that, though no. 4 does not itself occur in Diogenes' list, the *second* section of Diogenes' list contains the item *On Differences* (or *On Differentiae*: **68** no. 16). This *could* be an abbreviated version of **350** no. 4; but it may rather be a logical work. (Senn [1956] 45 suggested tentatively that it might rather be identified with the work *On Differences of Plants* which he identified as one constituent of *Research on Plants*. But see below, n. 402.)

¹³⁸ There are no ancient citations of 5c by title apart from the entry in the second section of Diogenes' list, though Joachim (1892) 10 linked the accounts of spontaneous generation at Antigonius, *Collection of Amazing Stories* 19 (the last of which is actually attributed to Aristotle by Antigonius; Aristotle fr. 367 Rose³) with 5c (Regenbogen (1940) 1426).

indeed, it is concerned to distinguish between creatures that occur in swarms because they are generated in this way and those that do so though generated in other ways. But the second title could have been given carelessly with reference to what is after all a prominent theme. Regenbogen (1940) 1445 suggests that the work also dealt with spontaneous generation of plants.

Balme (1962) argues that the work, dealing with particular animals rather than with the theory of spontaneous generation, cannot be taken as fulfilling Theophrastus' undertaking at *CP* 1.5.5 to investigate the topic of spontaneous generation, but in fact it is very much in Theophrastus' manner to convert a theoretical enquiry into a discussion of particular cases (cf., notably, *On Fire* 10), and in any case *CP* 1.5.5 can be read precisely as envisaging an investigation of particular cases.¹³⁹

See further below on **359**, **383**, **400**.

6 *On Creatures that Bite and Sting*

See below, on **360-1** and **369**.

7 *On Creatures that are said to be Grudging*

The inclusion of "said to be" in the full title is important, for Theophrastus argued that what appeared to be grudging behaviour on the part of animals other than human beings was not in fact so motivated. See further below, on **362**.

8 *On (Creatures) that Remain on Dry Land/ On Fish*

Schneider (1818-21) vol. 4 800-810. Rose (1863) 358-361. Regenbogen (1940) 1424, 1427-8. Huby (1986) 319. Sharples (1992,2).

In spite of the title *On Fish* (8d) found in the MSS, the text preserved there is not a general discussion of fish, but is concerned with two particular issues, sea creatures that come out of the sea onto dry land, and fish that burrow into or are generated in the earth. *Fish out of Water* might be the most appropriate title; the Greek *en xerôi* includes fish *in* the ground as well as on it. (This helps to explain the

¹³⁹ So Einarson and Link (1976-90) vol. 1 p. 141, rendering Theophrastus' plural ἀνιστορήσαι τὰς αὐτομάτους γενέσεις as "gather information about the *cases* of spontaneous generation".

use of “remain” and “spend time” in two of the variants of the title, which is difficult to render into natural English; the fish that burrow into the earth are ones that remain behind when the water retreats.) The text is damaged at the beginning, but there seems no very strong reason to suppose that the damage is extensive¹⁴⁰ or that the text we have was once part of a fuller discussion on fish generally (cf. however below on **364** and **375**). The text as we have it is approximately the same length as *On Vertigo*, **328** no. 1, and the title “On Fish” in the MSS may simply be due to an imprecise cataloguer. Equally, in spite of the form of the title in Diogenes and Athenaeus, there seems no strong reason to suppose, as Regenbogen suggested, that the work once included discussion of any creatures other than sea-creatures.¹⁴¹ It is true that Athenaeus in **350** no. 8b = **363** no. 2 refers to our text as the *fifth* book *On Creatures that remain on dry land*, and that this might suggest that our surviving text was originally the fifth book of a much longer work. But it may be that Athenaeus is referring to *On Creatures that remain on dry land* as the fifth book of *On Living Creatures*. See further below, on **363** no. 2.

9 *On Creatures that Change Colour*

See below on **365**.

10 *On Creatures that Hide*

See below on **366-370**. The work appeared, misattributed to Aristotle, in Ptolemaeus’ list of the works of the latter (Morauux [1951] 295; see above on **328** no. 15).

11 *On the Intelligence and Habits of Living Creatures*

Joachim (1892) 10-13, 25-53. Regenbogen (1940) 1370, 1407, 1432-4. Fortenbaugh (1971) 153. Flashar (1972) 40, 42-4, 69-77, 98-9. Huby (1986) 321-2. Lord (1986) 153 and n. 38. Cole (1992) 44.

We have no citations of the content of this work by name, and no indication of its theoretical preoccupations (cf. Huby [1986] 322).

¹⁴⁰ Regenbogen argues that our text is an abridgement of the original; see below on **363** nos. 3 and 5.

¹⁴¹ See further below on **371**. The use of “living creatures” rather than “fish” in the title is adequately explained by the fact that octopuses (cf. **365B**) are not properly fish. For Aristotle, at least, fish are blooded creatures, while octopuses are bloodless.

Being in only one book, according to Diogenes Laertius, it certainly cannot be a general title for all seven of nos. 3-10. It seems probable that there was some relation between it and *HA* 9 on the one hand and *Mirabilia* 1-15 on the other. Athenaeus cites two passages in *HA* 9 (which have no direct parallels in the Theophrastean material) as from Aristotle *On the Habits of Living Creatures* or *On the Habits and Ways of Life of Living Creatures*.¹⁴² Joachim argued that *HA* 9 was based on the Theophrastean work (though with the addition of other material too; Joachim 31). He noted that there are numerous parallels between *HA* 9 and points cited by later authors from Theophrastean works *other than* *On the Intelligence and Habits of Living Creatures*, and explained this by Theophrastus' habit of citing the same example in more than one context (for which cf. n. 118); *HA* 9, in his view, had reproduced the versions of such information found in our no. 11.¹⁴³

Against Joachim, Regenbogen (1940) 1434 argued that no. 11, which comes from the later, less reliable part of Diogenes' list, simply *is* *HA* 9 itself, this being a compilation including observations from various Peripatetics including Theophrastus, but that there had not been a separate Theophrastean work. Flashar (1972) 42-4 is more confident about the separate existence of the Theophrastean work.

Mirabilia 1-15 have parallels in *HA* 9, with the exception of *Mirabilia* 9 (goats in Cephallenia; see below on **355A** 3-4) and 10 (jealousy among wild asses in Syria).¹⁴⁴ Joachim argued that *HA* 9 and *Mirabilia* 1-15 derive from a common source in the Theophrastean work, *HA* having omitted the material in *Mirabilia* 9 and 10.¹⁴⁵ Flashar (1972) 42-4 however argues that the *Mirabilia* material¹⁴⁶ derives from Theophrastus' treatise through *HA* 9 rather than directly.¹⁴⁷

At *CP* 2.17.9 Theophrastus refers to "the *historiai* concerning these" (sc. living creatures) for a series of examples of associations between living creatures, such as that between the shellfish *pinna* and a type

¹⁴² 282c ≈ 620b33, 307c ≈ 610b14. Joachim (1892) 11.

¹⁴³ Antigonus 27-60 cites extensively from *HA* 9, citing his material as from Aristotle (26b). Cf. Giannini (1964) 114.

¹⁴⁴ With the latter Rose (1863) 332 compares Pliny 8.108, Solinus 27.27 (p. 121.16-122.2 Mommsen).

¹⁴⁵ Joachim (1892) 13, 20-3.

¹⁴⁶ With the possible exception of 9 and 10; Flashar (1972) 40.

¹⁴⁷ Flashar also derives from this Theophrastean work *Mirabilia* 64 (Flashar [1972] 40, 98-9; but this may rather come from *On Creatures that Hide*; see below on **366-70**) and 118 = *HA* 9.36 620a33 ff. (Flashar [1972] 41, 130; Giannini [1966] 281 however derives the whole of 115-129 from Theopompus.)

of crab, *Pinnotheres veterum* Bosc.¹⁴⁸ These references can be located in *HA* 5 and 6 (cf. Einarson-Link [1976-90] vol. 1 346-7),¹⁴⁹ but Joachim 6 argues that Theophrastus does not refer in this way to works by Aristotle and that the reference is to a discussion by Theophrastus himself in our no. 11.¹⁵⁰ If Joachim is wrong and Theophrastus in *CP* 2.17.9 does intend a reference to Aristotle's *HA*, the form of the reference is significant for the close collaboration between the two. Other items in this section of the *Mirabilia* also have Theophrastean parallels;¹⁵¹ *Mirabilia* 4 in *HP* 9.16.1 (goats in Crete that eat dittany to rid themselves of arrows) and *Mirabilia* 5 in *CP* 2.17.4 (ivy on the horns of stags).¹⁵² *Mirabilia* 8 (hedgehogs making their holes according to the direction of the wind) occurs also in [Theophrastus] *On Weather-Signs* 30, which Joachim (loc. cit.) argues reflects original Theophrastean material; however, Cronin (1992) 334 and 336 argues that the zoological signs in the pseudo-Theophrastean *On Weather-Signs* come either from Aristotle or from the author's own observation.¹⁵³

Joachim also derives Pliny 8.114 from this Theophrastean work; see below n. 240. See also below on **372** and **412**.

12 *On Ways and Characters and Habits*

Huby (1986) 322.

This is cited by Priscian among his sources in the preface to *Answers to Chosroes*; cf. also **137** nos. 1b, 5b, 16b, and **328** no. 11b. At first sight, it might seem natural to identify **350** no. 12 with no. 11, especially as *ēthos* in that title can have the specific sense of "habitat".¹⁵⁴ But Huby argues rather for a link between no. 12 and no. 4, point-

¹⁴⁸ D'A.W. Thompson (1947) 200-2. Cf. also **545**.

¹⁴⁹ That to the *pinna* and crab also at Cicero *On Ends* 3.63, Plutarch *On the Intelligence of Animals* 30 980b and Aelian 3.29.

¹⁵⁰ Joachim further (22-3) connects the passage with *Mirabilia* 3, which refers like it to the cuckoo laying its eggs in the nests of other birds; but whereas *CP* 2.17.9 refers in this connection to the warbler (*hupolais*, *Sylvia* spp., *Hupolais* spp.; D'A.W. Thompson [1936] 295. Einarson-Link [1976-90] vol. 1 p. 347 say rather the wheatear, *Oenanthe* spp. Cf. also *HA* 6.7 564a2, 9.29 618a8; Antigonus 100.), *Mirabilia* 3 refers rather to doves (*phatta*, *Columba palumbus* L.; cf. Thompson [1936] 300) and turtle-doves (*Trugones*, *Turtur communis*; D'A.W. Thompson [1936] 290).

¹⁵¹ For what follows cf. Joachim (1892) 23.

¹⁵² For *Mirabilia* 5 see also below on **362A** 3-5.

¹⁵³ The specific reference to Byzantium in *Mirabilia* 8 will on any account be a characteristic addition by the compiler of that work; cf. below on **355-8**.

¹⁵⁴ This indeed being the first sense for the word in LSJ. Vivian Nutton suggests

ing out that one section of Priscian's discussion (*Answers to Chosroes* 8) is concerned precisely with differences between creatures depending on locality. Bywater at *Suppl. Arist.* 1.2 p. xii suggests that Priscian's ch. 8 derives primarily from Albinus, named by Priscian as a source at 42.9, but Huby argues that Theophrastus was used as well, suggesting in particular that 92.18ff. (absence of hares in Ithaca, parallel to *HA* 8.28 606a2ff.) derives from him.¹⁵⁵

137 no. 10b (q.v.) was emended by Meurs from *On Coming-to-Be* to *On the Coming-to-Be <of Animals>*, and Regenbogen (1940) 1431 treats it as a work on animal generation. Usener 21 however suggested that **137** no. 10b is the same as **137** no. 10a. For references to Theophrastus on animal generation see above, on **350** no. 5, and below, **376-383**.

WRITINGS ON LIVING CREATURES

351 Apuleius, *Self-Defence* 36 (*BT* p. 41.16-17, 20-6 Helm, ed. a. 1959)

Rose³ p. 215. Joachim (1892) 12. Regenbogen (1940) 1432. Wehrli vol. 6² (1968) 26 (Lyco fr. 28); *ibid.* vol. 8, 112 (Eudemus fr. 125). Courcelle (1969) 87-8 and n. 208.

Apuleius (the rhetorician, novelist and philosopher of the second century A.D.) is here defending himself against the charge that familiarity with natural science implies an interest in magic; he had been accused of gaining the love of a wealthy widow by sorcery. Lyco was the successor of Strato as head of the Lyceum, and more noted for luxurious living than for contributions to either science or philosophy. W. Capelle (art. 'Lycon', *RE* 13 (1927) 2306) mentions the possibility that "Lyco" might here be an error for "Strato"; Wehrli considers the possibility that Apuleius here gives a list of leading Peripatetics without any reference to actual interest in zoology, but notes that there is some evidence for an interest in natural science by Lyco also in fr. 28 Wehrli (on salt). A number of zoological ob-

to me that the Latin may reflect an original Greek *Peri tropôn kai êthôn*, the translator being unsure how to take *êthê* and using a double translation as a compromise.

¹⁵⁵ This chapter of Priscian also includes, at 91.6-14, material found in **218**, but explicitly attributed by Priscian to Strabo.

servations are attributed to Eudemus (fr. 125-132 Wehrli; cf. Sorabji [1993] 46), though Wehrli is doubtful about their authenticity. Cf. below, **360**.

352 Jerome, *Against Jovinian* 2.6 (*PL* vol. 23 col. 293A, ed. 1845)¹⁵⁶

J.N.D. Kelly, *Jerome: his life, writings and controversies*, London: Duckworth, 1975, 184.

The approximate date of *Against Jovinian* is 393 A.D.; Jerome lived from 348 to 420 A.D. The work is a rhetorical polemic against Jovinian, who had attacked the extreme asceticism advocated by Jerome; cf. Kelly 180-8, and our **486**.

The present passage is from Jerome's reply to Jovinian's questioning of the spiritual value of fasting. Jovinian had argued (2.5) that animals were created by divine providence for man's benefit, citing *Romans* 14:20 and *I Timothy* 4:1-5. Jerome replies that this is not exclusively with a view to their being eaten, and that some creatures have value for medicinal purposes though not as food. Immediately after the passage cited he goes on to say that, if Jovinian asks him why pigs were created, he will respond, "in the manner of squabbling children"—Jerome's own words—by asking why vipers and scorpions were.

Aristotle occasionally suggests that animals exist for our benefit,¹⁵⁷ but it is not his general view; and Theophrastus in discussing botany devotes considerable attention to the apparent conflict between a plant's own end and that of its cultivators. Cf. also **584A** §§13 and 25.¹⁵⁸ Jerome is admittedly associating the authorities cited here with explanations of the usefulness of particular creatures, rather than with a general theoretical claim; but he does clearly suggest that these authors found some usefulness for *every* creature. This is rhetorical exaggeration rather than precise reporting, however.

Marcellus of Side was a second century A.D. didactic poet; his work on medicine is lost but fragments of his work *On Fish* survive. Flavius was a poet of the late third/early fourth century A.D.: cf.

¹⁵⁶ In the 1845 printing of *PL* vol. 23 this passage appears in column 293A, but in the 1883 reprinting in column 306.

¹⁵⁷ Aristotle, *Politics* 1.8 1256b15ff.

¹⁵⁸ On the question how far Heliodorus in **139** is drawing on actual knowledge of Theophrastus' zoological writings, or at least of their titles, cf. the Commentary there, and Sharples (1988,1) 49-51.

R. Herzog, *Handbuch der Lateinischen Literatur der Antike* vol. 5, Munich: C.H. Beck, 1989, 75; *PRLE* 1.349. For Dioscorides see below on **388**.

- 353** Denis the Carthusian, *Exposition of the Book of Wisdom* 7.20, art. 7 (vol. 7 p. 459bC ed. 1896-1913)

Denis the Carthusian, *Doctor Ecstaticus*, lived from 1402 to 1471. For his interest in Theophrastus cf. **140** and the Commentary there, and the Index to our text and translation volumes, vol. 2 pp. 655-6. The present report however is hardly in itself evidence for direct, first-hand acquaintance.¹⁵⁹ *Wisdom of Solomon* 7.17-20 asserts that "(God) himself gave me true knowledge of the things that are: . . . the natures of living creatures and the tempers (*thumoi*) of wild beasts". Denis interprets this in terms of the practical uses of living creatures, for medicine or magic (the distinction in any case not being a hard-and-fast one); cf. **139**. The passage in *Wisdom* comes towards the end of a long sequence of references to various types of knowledge, not all self-evidently practical, but there is a reference to "the varieties of plants and the virtues of roots" later in the same verse.

- 354** Albert the Great, *On Animals* 21.1.2 (p. 1325.35-1326.1 and 1326.6-11 Stadler)

Albert the Great (1193-1280) was the teacher of Thomas Aquinas, and wrote prolifically on philosophy and natural science; he refers frequently to Theophrastus (see the index to our text and translation volumes), but it is not always clear from what sources he obtained his information. The view attributed to Theophrastus here, that living creatures have varying degrees of perfection both in body and in soul is also attributed to him by Porphyry in **531**; there is other evidence suggesting that Albert's knowledge of Theophrastus was bound up with Porphyry (see below on **376-9**). **531** is to be connected either with *On Piety* (= **580** no. 11) or with *On the Intelligence and Habits of Living Creatures* (= **350** no. 11); see Fortenbaugh (1984) 270, 276.

It is not clear that Albert necessarily intends to attribute to Theophrastus more than what is stated in the first four lines of our extract (as far as "with regard to the capacities of soul"); the further elaboration may be his own.

¹⁵⁹ I am grateful to Vivian Nutton for pointing this out.

DIFFERENCES ACCORDING TO PLACE

355-8 Rose (1863) 280, 328. Joachim (1892) 16. Regenbogen (1940) 1426. Kroll (1942) 8. Flashar (1972) 40-1, 101-2.

In addition to **355-8** cf. also **362D**, **365B** and commentary.

Sources

Our collection of texts is arranged by subject-matter rather than on the basis of the attribution of material to particular lost Theophrastean works. We are not therefore claiming that all the material in **355-8** comes from a single Theophrastean work. On the problem of the relation of *On Differences with regard to Locality* to *On Differences of Voice in Creatures of the Same Kind* on the one hand and to *On Ways and Characters and Habitats* on the other, see above on **350** nos. 3, 4 and 12.

There are particular difficulties in reconstructing Theophrastus' observations on the present topic. It is natural for reports on a wide range of zoological subjects to have a place-name attached to them, and this can give the false impression that local differences were the primary concern even where that is not in fact the case. Moreover, the compiler of the *Mirabilia* prefixed a place-name to every item he included, in order to give a spurious impression of learning, even where this distorted the point he was making.¹⁶⁰ Several of our sources combine material on local differences with that on venomous creatures, even where the latter is concerned with particular creatures existing in certain places rather than strictly with differences in creatures *between* different places.¹⁶¹ This *may* reflect the activities of compilers, but if so these took place early, for *HA* 8.29 shares this feature. It may be that Theophrastus himself combined the two types of material.

Differences among animals according to place are the theme of *HA* 8.28-9. See above n. 87. *Mirabilia* 68 (≈ **355A** 25-6; see ad loc.), 69a (= **357**) and 70 (= **355** 33-5) derive from Theophrastean material on local differences.¹⁶² Flashar notes that *Mirabilia* 69b (in Crete,

¹⁶⁰ Cf. Joachim (1892) 21; Flashar (1972) 43-4; Huby (1986) 325 n. 26.

¹⁶¹ See below, **355A** 5-7, 28-31; Pliny 8.225-9; and below on **358**, **360-1**.

¹⁶² Cf. Joachim (1892) 16, arguing against Rose that these items come from *On Differences according to Place* rather than from *On Differences of Voice between Creatures of the*

poplars bear fruit) is paralleled in *HP* 2.2.10 and 3.3.4,¹⁶³ and that if it came from *On Differences according to Place* it would be the only botanical, as opposed to zoological, example in that work. It is nevertheless more likely, as Flashar says, that Theophrastus repeated the observation in *On Differences According to Place* as a short parallel than that the compiler of the *Mirabilia* has switched from one Theophrastean source to another and back again. See below, on **366-70**. *Mirabilia* 83, reporting the saying that in Crete there are no wolves, bears or snakes because it is where Zeus was born (cf. **355A** 1) is also ascribed to Theophrastus by Giannini and Flashar;¹⁶⁴ but the similar reports in *Mirabilia* 122, 124, 128-9 and 176 are from other sources. At *HP* 9.20.3 Theophrastus observes that Athenian cattle have developed immunity to thapsia (*Thapsia garganica* L.) but it is dangerous to those imported from elsewhere.¹⁶⁵

Doctrine

Variations in plants resulting from different local environments are an important theme in *CP*, for example at 4.2.2 = *HP* 8.11.3 (beans keep longer at Apollonia and Cyzicus) and 6.18.1-3 (the fragrance of plants depends on climate).¹⁶⁶ In the present group of texts similar points are applied to animals.¹⁶⁷ Explanations are sometimes attached and sometimes not; it is highly probable that the subsequent transmission has often reported the alleged facts but neglected the explanations.

Theophrastus clearly discussed both differences due to environment (especially heat and cold; cf. **355A** 45-51 and notes ad loc.; Regenbogen [1940] 1426) and those due to difference in species (**357**). His

Same Kind—Joachim regarded these as two different works, cf. above on **350** nos. 3-4—because *Mirabilia* 69 involves no reference to sound.

¹⁶³ Cf. Amigues (1989) p. 127 n. 11. In *HP* 2.2.10 the tree concerned is referred to as "the so-called poplar".

¹⁶⁴ Giannini (1966) 259; Flashar (1972) 41 and 109.

¹⁶⁵ Scarborough (1992) 144 and n. 77. [Aristotle] *Problems* 10.39 contrasts human beings, whose speech differs in different places, with other creatures which do not exhibit such variation.

¹⁶⁶ Cf. also **413** no. 16.

¹⁶⁷ On adaptation to environment cf. also *HP* 4.3.5 (the camel), with Cole (1992) 56. The camel's adaptation has however, as Cole points out, become part of its very nature; by contrast, some of the differences in the present group of texts are purely temporary, being reversed when the creatures are moved to a different environment.

discussion differed from *HA* 8.28 in as much as that text is concerned with differences in which animals are present or thrive in a particular locality, not with differences in behaviour (apart from dying) when taken from one locality to another.¹⁶⁸ Animal sound, it may be noted, is linked with local variations at Aristotle *GA* 788a16.

355A Aelian, *On the Nature of Animals* 3.32-8 (*BT* vol. 1 p. 73.32-76.2 Hercher) Rose (1863) 329, 331, 338, 351-2. Joachim (1892) 23-4. Regenbogen (1940) 1424. Kroll (1942) 10. Flashar (1972) 74, 109. Huby (1986) 322. Battagazzore (1993) 228-9.

Theophrastus is here cited explicitly for the absence of wolves in places on Olympus (§32), for the different sounds of partridges (§35), for the silence of the frogs in Seriphus (§37), for cocks not crowing where it is damp (§38) and for cicadas singing when warmed by the sun (§38). Some other points not explicitly attributed to Theophrastus by Aelian are confirmed as his by other sources (see further below). It is nevertheless improbable that the whole of **355A** derives from Theophrastus; but, in conformity with our usual policy, the entire sequence has been printed as a single text precisely in order to facilitate discussion of this question. See especially below on 18-20.

1 Crete is very hostile to wolves and reptiles] That wolves and snakes, and also bears, are not found in Crete is reported in *Mirabilia* 83, derived from Theophrastus by Giannini and Flashar.¹⁶⁹ The parallel Pliny reference should be 8.227, not 8.277; see also 25-6 below.¹⁷⁰ Similarly also Priscian, *Answers to Chosroes* 8 92.24-93.3.

3-4 Goats in Cephallenia do not drink for six months] So *Mirabilia* 9,¹⁷¹ Antigonus 128b (who places them in Zacynthus), Valerius Maximus 1.8 ext.18 (*BT* p. 56.1-5 Kempf). Joachim 23-4 argues that the reference in *Mirabilia* 9 came from Theophrastus *On the Intelligence and*

¹⁶⁸ Joachim (1892) 8 suggests that Theophrastus' interest in differences of sound was prompted by *HA* 4.9 536a13; that passage, in a context generally concerned with the sounds of *different* species, relates to mating calls, an example of different sounds in different contexts rather than of differences due to *environmental* circumstances.

¹⁶⁹ Above, n. 164. Cf. also Antigonus 10 (Joachim [1892] 10).

¹⁷⁰ A. Ernout, in the Budé edition (*Pline l'ancien*, vol. 8, 1952, p. 177), links the whole of Pliny 8.225-9 with *HA* 8.28.

¹⁷¹ In a series of statements about animal behaviour that generally seem linked rather with **350** no. 11, on which see the Commentary.

Habits of Living Creatures, but the one in the present passage from *On Differences according to Place*, so that we have here an example of Theophrastus, as often, citing similar examples in more than one work. Alexander of Myndus, cited by Aelian 5.27 for the sheep in Pontus that grow fat on wormwood (cf. **413** no. 108), goes on to place the abstemious goats on Mimas in Syria.¹⁷² Flashar observes that goats can in fact live for a long time without fluids and tolerate sea-water.

4 You will not see white Budinian sheep] Cf. **218A-D**, and especially **218A.8**, for Theophrastus' interest in such matters. The Budini are located by Herodotus in Southern Russia east of the Don (4.21: to the north of modern Volgograd). They later moved westwards to modern Poland and Hungary.¹⁷³ See below, n. 295.

5-7 some of them bite and inject poison with their teeth, but (others) sting] Theophrastus wrote a treatise on precisely this topic (**350** no. 6); see below on **360-1**, and on the general question of the relation between Theophrastean material on poisonous creatures and on local variations see above at n. 161.¹⁷⁴

7-10 The Libyan asp, I hear] Similarly Aelian 6.38. Rose (1863) 351-2 derives this from Theophrastus, *On Creatures that Bite and Sting*.

11 The goats on Scyros] an Aegean island in the Sporades group.

13-17 It is said that it is the Nile that is responsible for this] That the water of the Nile promotes fertility is also cited from Theophrastus *On Waters* by Athenaeus in **214A**. Aelian (or his source) may be combining material from different Theophrastean treatises; or Theophrastus may have included the same observation in more than one work.

18-20 A horn, they said, was brought from India] A Theophrastean origin for this seems at first to be ruled out by the reference to Ptolemy II, since Theophrastus died in 288/7 or 287/6¹⁷⁵, and Ptolemy II

¹⁷² Flashar (1972) 74 argues that Theophrastus is here Alexander of Myndus' source. Aelian however goes on to cite Theophrastus (= **363** no. 1) as a *different* source from Alexander.

¹⁷³ How and Wells (1912) vol. 1 p. 310.

¹⁷⁴ Huby (1986) 323 suggests that Aelian's source here is the Alexandrian zoologist Sostratus, who wrote a treatise *On Creatures that Sting and Bite*; cf. Gossen, *RE* 13A.1 (1927) 1204, and below on **370B**.

¹⁷⁵ Cf. Sollenberger (1992) 3843.

became joint ruler with his father in 285 and came to the throne in 283/2. However, Walter Cockle points out to me that a reference by Theophrastus to Ptolemy Philadelphus before he became king could have been rephrased later in its transmission in terms of the name by which he was subsequently known. Given his scientific interests it does not seem inconceivable that curiosities could have been sent to him even before he became king. On the other hand, while the Theophrastean reference to Nile water in 13 is introduced by "it is said" (*legetai*), 18-20 (and 28-32 below) are introduced by "they say" (*phasin*).¹⁷⁶

21-24 You will 'never hear one sound from all partridges] Cf. **355B**.

25-6 The frogs are completely silent in Cyrene] This is confirmed as Theophrastean by Pliny in **355C**. *HA* 8.28 606a6 and Pliny 11.267 say that vocal frogs were not *previously* found in Cyrene. The silent frogs in Cyrene (along with those in Seriphus: 33-5, 45-7 below) are also reported by Apostolius, *Centuriae* 4.77 = Arsenius 12.76 (*Paroem. Gr.* vol. 2 p. 326.8-12),¹⁷⁷ with the explanation that their silence is due to the bitterness of the water; similarly Theophrastus Simocatta, *Dialogus* 18 (p. 25.24-26.7 Boissonade). Cf. Flashar (1972) 101, who interprets these frogs as a particular species silent in summer, *Rana temporaria*.

26 as are the pigs in Macedonia] In *Mirabilia* 68 the silent frogs in Cyrene are coupled not with silent pigs in Macedonia but with *solid-hoofed* pigs in Macedonia.¹⁷⁸ Pliny 11.267 has silent frogs and boars in Macedonia. Kroll (1942) 10 suggests that the placing of the silent frogs in Macedonia rather than Cyrene is a slip by Pliny, and argues that the parallel between Pliny and the *Mirabilia* is to be explained by a common use of Theophrastus.

26-7 and there is a kind of cicada that is silent as well] No explicit reference is here made by Aelian to a difference in place. There was however a well-known story that cicadas were silent in the territory of Rhegium in southern Italy but vocal in that of Locri;¹⁷⁹ and this

¹⁷⁶ Large-horned oxen in Paeonia are reported in *Mirabilia* 129 (from Theopompus, according to Flashar [1972]), but the size is much less (four *choai*).

¹⁷⁷ For Apostolius and Arsenius see above on **339**.

¹⁷⁸ For which cf. *HA* 2.1 499b12, Antigonos 66 (from Aristotle), Pliny 11.255. Rose (1863) 328; Flashar (1972) 101.

¹⁷⁹ Antigonos 1, citing Timaeus; Pliny 11.95; Pausanias 6.6.4, relating the contrast to territory on each side of the river Caecines which formed the boundary;

has been linked with Theophrastus, *On Differences according to Place* by Rose and others.¹⁸⁰ Moreover two of the sources¹⁸¹ give the shadiness and dampness of the place as the reason for the silence of the cicadas, and Rose (1863) 330 regards this as genuinely Theophrastean, noting that the sound of cicadas is said at Aristotle *On Respiration* 9 474b31ff. to be caused by the insect's movement of its membrane to cool itself. Aelian himself confirms that Theophrastus connected the sound of cicadas with heat, at lines 50-1 below. There was also a miraculous explanation that the cicadas were silenced by Heracles;¹⁸² Aelian does not mention this in our text, but his reference is very much in passing in any case.

28-32 They say that there is a kind of venomous spider] This is not presented as a matter of local *differences* at all. See above, at n. 161.

33 In Seriphus there are frogs which you will not hear uttering any sound at all] So also Antigonus 4¹⁸³ and *Mirabilia* 70.¹⁸⁴ Flashar [1972] 102 suggests that in the original Theophrastean work the frogs in Seriphus were mentioned immediately after those in Cyrene; it is strange that both in Aelian and in the *Mirabilia* other material should

Diodorus Siculus 4.22.5; Solinus 2.40 (p. 41.5-9 Mommsen); Isidore, *Etymologies* 12.8.10. Strabo 6.1.9 reverses the references to Rhegium and Locri; and Aelian himself at 5.9 says that the cicadas from each place are silent in the other. Cf. A. Ernout and R. Pepin, *Pline l'ancien* vol. 11, CB 1947, p. 149 ad loc. HA 8.28 605b28, referring to Cephallenia, says only that cicadas occur on one side and not the other of a river there, and nothing about their being silent or not, contrary to what is said by Ernout and Pepin loc. cit. and by P. Levi, *Pausanias: Guide to Greece* [Harmondsworth: Penguin, 1971], vol. 2 p. 302 n. 48. Similarly Antigonus 3 (attributed to Theophrastus by Joachim [1892] 9 and 22).

¹⁸⁰ Rose (1863) 329, Joachim (1892) 9, and Regenbogen (1940) 1426; Joachim also links with the Theophrastean work the report in Antigonus 9.1 of islands off Lemnos, called "new", in which partridges cannot live.

¹⁸¹ Antigonus and Strabo, locc. citt.

¹⁸² Heracles silenced the cicadas because they disturbed him while he was sleeping; Antigonus 2. Compare below, lines 38-47. Joachim (1892) 9 indeed attributes this account to Theophrastus, pointing out that Diodorus Siculus 4.22.5, which he derives from Timaeus (cited at 4.21.7 and 4.22.6), has Heracles praying that the cicadas should *disappear*. (However, Antigonus 1, where Timaeus is also cited, refers to silence rather than disappearance.)

¹⁸³ Attributed to Theophrastus by Joachim (1892) 9.

¹⁸⁴ Cf. also Apostolius, *Centuriae* 4.77 = Arsenius 12.76 (*Paroem. Gr.* vol. 2 p. 326.8-12), cited above on 25-6, who explain the silence of the frogs in Seriphus by the coldness of the water and say that they become vocal if moved elsewhere (see below). Diogenianus *Cent.* 2.98 (*Paroem. Gr.* vol. 2 p. 17.9-11) says not that the frogs are silent in Seriphus, but that frogs from Seriphus become silent when taken to Scyros; similarly the Suda s.v. *batrachos ek Seriphou* (190, vol. 1 p. 463.1-2 Adler).

have intervened and that it is partly the same but partly not.¹⁸⁵ Seriphus is an Aegean island in the Cyclades group. In the cases both of the frogs at Seriphus and of those on Pierus it is clear that the environment is the cause of the phenomenon, since removal of the creatures elsewhere makes them vocal and others when imported become silent. This supports Theophrastus' explanation, at 45-7 below, in terms of the coldness of the water; whether Aelian intends that to apply to the lake on Pierus as well is unclear, but a seasonal lake formed by winter mountain streams might well be cold. Whether Theophrastus himself mentioned the mythological explanation is uncertain; it may be that Aelian or his source has introduced the story and then used Theophrastus to reject it.¹⁸⁶ The case of **362**, below, is not the same, for we are not there dealing with rejected *mythological* explanations. See also above, on 26-7.

49 The lake at Pheneus produces no fish] This comes between two items both of which are explicitly attested as Theophrastean by Aelian. Rose (1863) 330 notes that this lake is frequently referred to by Theophrastus: cf. *HP* 3.1.2, 5.4.6, 9.15.7, *CP* 5.14.9, and **213B-C**.

50-1 And cicadas . . . sing when they are warmed by the sun] This is not presented as a difference due to place at all; but cf. above on 26-7.

355B Athenaeus, *The Sophists at Dinner* 9.43 390A (*BT* vol. 2 p. 350.14-18 Kaibel)

Rose (1863) 329. Joachim (1892) 8-9. D'A.W. Thompson (1936) 137.

Cf. **355A** 21-4. Pollux *Onomasticon* 5.89 (*Lexicographi Graeci* vol. 9.1 p. 286.4-5 Bethe) gives the two words "cackle" (*kakkabizein*) and "twitter" (*titubizein*), applied to partridges as here, but without the geographical details; similarly *HA* 4.9 536b13-15, but with *trizein* (usually of squeaking, creaking sounds) rather than *titubizein*. The sounds made by birds of the same type do as a matter of fact vary in different geographical regions, but the very considerable difference indicated

¹⁸⁵ In Aelian the *silent* pigs in Macedonia, the silent cicadas, and the venomous spider; in the *Mirabilia* the *solid-hoofed* pigs, fertile mules and poplars in Crete.

¹⁸⁶ In which case "rejecting the story" would be Aelian's (or his source's) way of coupling the two accounts, rather than report of what Theophrastus himself wrote. Battagazzore (1993) 228-9 takes it in the latter sense, and argues that Theophrastus used the mythical story for rhetorical purposes, as the starting-point of his discussion.

by Theophrastus' wording suggests that D'A.W. Thompson (1936) is right to explain the difference here as one of species, the partridge proper to Greece (*Perdix graeca* = *Perdix saxatilis* auctt.) crying *cacabis*, the common partridge (*Perdix cinerea*) *girrah* or *ripripri*. The common partridge is now found only in Northern Greece, and it seems natural to suppose that in Theophrastus' time its range did not extend beyond Corydallus.

The question is made more complex, however, by other reports, not naming Theophrastus, which assert that partridges do not fly across the border from Boeotia to Attica,¹⁸⁷ or that if they do they are distinguished by their different sound.¹⁸⁸ D'A.W. Thompson interprets these texts on the same lines as the foregoing, taking "partridge" here to mean the common partridge.¹⁸⁹ Antigonus 6 describes the partridges in Attica as having good voices and those in Boeotia as "thin-voiced". However, Joachim (1892) 8-9 argued that there were originally two reports both deriving from Theophrastus, one referring to Corydallus and the other to Boeotia, and that the reference to sound, absent from the Pliny passage, has been added to the report concerning Boeotia by Athenaeus through a confusion with our passage. This however involves the difficulty that, if Theophrastus is the source both of Pliny's report and of **355B**, we must suppose that he used the term "partridge" more narrowly in one context than in the other. As for the claim that the two reports were originally separate, Joachim argues that there is "a considerable distance" between Corydallus and Boeotia. Corydallus was due west of Athens, on the coast opposite Salamis and at the southern end of Mount Aigaleos—i.e. *south* of the road from Athens to Eleusis. But it is still in the general direction from Attica of the greater part of the northern Greek mainland, and it does not seem unreasonable to suppose that the range of the common partridge moved further north between Theophrastus' time and Pliny's.

¹⁸⁷ Pliny 10.78, shortly before **355C**; Solinus 7.28 (p. 60.13-14 Mommsen). Kroll (1942) 12. The MSS text of Pliny, printed without comment in the Budé ed. (*Pliny l'ancien* vol. 10, ed. E. de Saint-Denis, 1961, p. 55), has the partridges in Attica and not crossing to Boeotia; but Gesner, followed by the Loeb (vol. 3, ed. H. Rackham, 1940, second ed. 1983, p. 342), emended *in Attica* to *in Atticam* to give the reverse sense.

¹⁸⁸ Athenaeus 9.43 390c, in the sequel to our passage. Kroll (1942) 12.

¹⁸⁹ So D'A.W. Thompson (1936) 235.

- 355C** Pliny, *Natural History* 10.79 (CB vol. 10 p. 55.8-12 de Saint-Denis)
D'A.W. Thompson (1936) 164-6.

2-3 doves and peacocks and stags (or “ravens”, with Palmarius’ very plausible emendation) are not indigenous to Asia] Menodotus of Samos is reported by Athenaeus (14.70 655a) as saying that peacocks, sacred to Hera, originated in Samos and domestic fowl in Persia. Rose (1863) 328 derives this from Theophrastus. The context in Athenaeus however suggests a religious tradition rather than a context of zoological observation. Peacock and cock were both called “the Persian (*Médikos*) bird” (D'A.W. Thompson [1936] 117); conceivably Menodotus was indicating that the name should be applied to the latter but not to the former. But since the peacock was commonly regarded as Indian or Persian, the report attributed to Theophrastus remains strange. Perhaps “Asia” here means only Asia Minor.

3-4 nor croaking frogs to Cyrenaica] See above on **355A** 25-6.

- 356** Aelian, *On the Nature of Animals* 10.35 (BT vol. 1 p. 260.23-4 Hercher)
Wellmann (1891) 487, 495. Kroll (1942) 13.

That a double heart is seen in the partridges in Paphlagonia is also reported from Theophrastus by Aelian and Gellius (see the Apparatus), and, from Pliny, by Erasmus, *Parabolae* (vol. 1.5 p. 300.271), on which work see the Introduction to this volume. Wellmann and Kroll argue that Gellius’ source was Favorinus, Aelian’s and Athenaeus’ Alexander of Myndus.

Both in Aelian 11.40 and in Gellius this report, attributed to Theophrastus by name, is followed by another concerning hares in Bisaltia having two livers, attributed by both authors to Theopompus.¹⁹⁰ There is however a variant version of the story in Pliny, giving the location as “Briletum, Tharnes and the Chersonese”, and Kroll attributes this version of the story to Theophrastus.¹⁹¹ Aristotle refers to hares near Bolbe in Macedonia—just south of the territory of the

¹⁹⁰ Theopompus, fr. 126 Jacoby; cf. also Aelian 5.27, naming Theopompus; *Mirabilia* 122, in a part of the collection deriving from him (Giannini ad loc.; Flashar [1972] 41); Athenaeus 401AB; Stephanus of Byzantium, s.v. *Bisaltia* (p. 170.17-19 Meineke). Rose (1863) 329; Flashar (1972) 132.

¹⁹¹ Pliny 11.190. Kroll also derives from Theophrastus the reference at Pliny 11.206 to stags at Briletum and Tharne with four kidneys.

Bisaltae, though he does not mention this explicitly—"and in other places", saying one might think these hares had two livers because of the length of the connections between the two parts of the liver.¹⁹²

357 Pliny, *Natural History* 8.173 (CB vol. 8 p. 84.3-4 Ernout)

Flashar (1972) 101.

As Aristotle in *HA* and Pliny here (but not the *Mirabilia*) note, the creature in question is not in fact a mule at all. Flashar identifies it as *Equus hemionus* or *Equus onager*.

358 Pliny, *Natural History* 11.281 (CB vol. 11 p. 118.14-17 Ernout)

A. Ernout and R. Pepin, *Pline l'ancien*, vol. 11 (CB 1947) ad loc.

This comes in Pliny at the end of a series of items (11.277, 279-281) apparently linked with Theophrastus *On Creatures that Bite and Sting* (cf. Regenbogen [1940] 1427). Pliny mentions creatures that eat poisonous ones and so become poisonous themselves, and this prompts the present remark about diet, which is strictly a digression.

Herodotus 5.16.4 refers to dwellers in lake-villages in Paconia, in Thrace, who feed their horses and beasts of burden on fish, and Aelian 17.30 repeats this information attributing it to someone called Zenothemis and emphasising the need for the fish to be alive. But it is more probable that the Theophrastean report concerns the southern coasts of modern Pakistan or Iran. Strabo, 15.2.2, mentions Ichthyophagi (fish-eaters) in Carmania, on the northern coast of the entrance to the Persian Gulf, who feed their animals on fish,¹⁹³ and provides a reason for their doing so (which our text lacks) in the aridity of the land and absence of other food-stuffs.¹⁹⁴ Moreover Strabo's source here is Alexander the Great's admiral Nearchos;¹⁹⁵ and we know that Theophrastus in his botanical writings incorporated reports from Alexander the Great's expedition.¹⁹⁶

¹⁹² *HA* 2.17 507a16; similarly, without specifying the place, *PA* 3.7 669b34.

¹⁹³ No such detail is included in the references to Fish-Eaters in Arabia (Pliny 6.149) and Ethiopia (Strabo 16.4.7, 13; Pliny 6.176; Solinus 56.9 (p. 209.1 Mommsen).

¹⁹⁴ Cf. 15.2.14. Strabo also mentions the Ichthyophagi in the general context of the nature of sub-tropical regions at 2.2.3; and refers to others in Gedrosia, further east on the same coast in 2.5.33 and 36. Cf. also Pliny 6.96.

¹⁹⁵ Cited at 15.2.1, 5 and 13; cf. W. Capelle, *RE* 16.2 (1935) 2147, and Pliny 6.95ff. (above).

¹⁹⁶ Amigues (1988) xxiv-xxx argues that Nearchus was more interested in climate

Pliny, followed by Solinus and Isidore, mentions Ichthyophagi in India (= Gedrosia?), with no reference to their feeding their animals on fish, but adds that Alexander forbade their eating fish.¹⁹⁷ Given that this was their only available foodstuff, this seems a harsh thing to do. Possibly this is a garbled report of Alexander's demanding the fish as food for his own men; possibly it reflects, again in garbled form, annoyance at the unpleasant taste of animals fed on fish. For Plutarch, *Alexander* 66, reports that the army in passing through this region found the meat of sheep fed on fish unpleasant.¹⁹⁸ Aelian 16.35 cites Orthagoras as saying that in an Indian village called Coÿtha the goats, when penned, are fed on *dried* fish.¹⁹⁹

SWARMS OF CREATURES

359A-C Rose (1863) 280, 333-7. Joachim (1892) 15. Regembogen (1940) 1426-7. Capelle (1955) 171-2. Balme (1962) 103. Flashar (1972) 40, 79-82. Hughes (1988) 73.

See above, **350** no. 5.

Sources

Photius in **359A** provides a summary of Theophrastus' treatise, which can be supplemented from the sources in **359B** and **C**. There is

and crops from the point of view of a military leader planning campaigns than from that of a botanist, and after a review of several possible informants suggests (xxix) that Theophrastus' source for botanical information on the coast of Gedrosia was one Stroebeus, a protégé of the executed Callisthenes. Amigues' argument depends in part on the botanical informant having accompanied Alexander on the march from India back to Persia overland, whereas Nearchus led the naval contingent. The information in the present text could have come from the naval contingent; but see further below.

¹⁹⁷ Pliny 6.95; Solinus 54.3 (p. 202.1 Mommsen); Isidore 9.2.131.

¹⁹⁸ That the meat of the animals fed on fish had an odour of fish is noted by Strabo 15.2.2 (from Nearchus? above). Plutarch locates the army's sufferings in the territory of the Oreitae, but should in fact have said in Gedrosia, adjacent to Carmania; cf. N.G.L. Hammond, *Sources for Alexander the Great*, Cambridge: Cambridge University Press, 1993, 124-5, suggesting that Plutarch's source is Cleitarchus, and cf. *ibid.* 275-6 for the use of Cleitarchus by Arrian and Strabo. That Gedrosia is like the country of the Ichthyophagi is noted by Strabo 15.2.14.

¹⁹⁹ I am grateful to my colleagues Alan Griffiths and Robert Ireland for discussion of the present text.

again a related sequence of items in the *Mirabilia*: 23 refers to large numbers of snakes in Thessaly eaten by storks and 24 to large numbers of snakes in Sparta (cf. below on **359A** 42-3), 25 to mice eating iron in Cyprus and 26 to mice eating gold among the Chalybes (cf. **359A** 52-4 and **359C** 2-6), 27 to scorpions in Persia (cf. **359B** 1-6), and 28 to different kinds of mice in Cyrene (cf. **359B** 7-11, **359C** 1-2). For the relation of this text to the work *On Creatures produced spontaneously* attributed to Theophrastus by Diogenes Laertius see above on **350** no. 5.

Doctrine

Photius makes it clear that Theophrastus was concerned to distinguish between creatures that are produced spontaneously in large numbers in favourable circumstances, and others which, though not spontaneously generated, appear in large numbers because a change of climate or the nature of a region is particularly favourable to them. (On spontaneous generation see below, **383**; also **400**.) Theophrastus also discusses the ways in which swarming creatures are destroyed, whether by climate, disease, or human agency, but does not seem to have considered population crashes due to exhaustion of the food supply; see below on **359A** 44-52. Reference to the nuisance caused by swarming creatures is the aspect stressed, along with emphasis on the marvellous, in the reports in **359B-C**. Cf. also **366**, where the fact that snails are seen most in the autumn is explained by their emergence from aestivation.

359A Photius, *Library* 278 527b11-528a39 (*CB* vol. 8 p. 164.3-166.17 Henry)

Theophrastus' *On Creatures that Appear in Swarms* is preserved in a summary that forms one of a series in Photius' *Library*. For a list of these summaries and some remarks on their general character, in so far as it can be controlled by comparison with those works that also survive in MSS of Theophrastus, see above on **345**.

7 the little frogs . . . are not rained down, as some people thought] Theophrastus' fellow-townsmen Pha(i)nia (fr. 17a-b Wehrli) reported a rain of *fish*—not snails or frogs—in the Chersonese that lasted three days. Regenbogen (1940) 1426-7 suggests that Theophrastus is here engaging in polemic against Phanias; for communication between the

two on zoological topics he compares **374**. For similar stories cf. Athenaeus 8.6 333ab, citing Heraclides Lembus (in Paeonia and Dardania); Aelian 2.56 (between Naples and Pozzuoli); Aelian 17.41 = Iustinus (Trogus) 15.2.1 (the Autariatae were driven out by half-formed frogs which fell from the sky). Capelle (1955) 171-2 points out, against Regenbogen (who is followed by Balme [1962] 103), that this passage is not necessarily evidence for scepticism on Theophrastus' part about *spontaneous* generation, for we are not told what those who believed in rains of frogs thought the origin of the frogs was. Theophrastus *may* have in mind the belief that seeds come down with the rain, for which he cites Anaxagoras at *HP* 3.1.4 and *CP* 1.5.2; but Photius' summary does not tell us so, and in any case this, being generation from seeds, would not be true spontaneous generation (see also below n. 378, and on **400**).²⁰⁰

29 above all those (locusts) which they call *broukoi*] Cf. Hesychius s.v. (no. 1206, vol. 1 p. 349 Latte).

33 in the dog-days they become frenzied] For the illness of animals at the dog-days see also *HA* 8.19 602a25, 602b22,26: O. Wenskus, *Astronomische Zeitangaben von Homer bis Theophrast*, *Hermes Einzelschriften* 55 (1990) 151.

40-2 there are two causes of the generation of serpents] Balme (1962) 103 n. 5 comments that this section "can hardly be right", but gives no further explanation.

42-3 there once occurred an abundance of serpents in Thessaly] *Mirabilia* 23-4 reports that there are so many snakes in Thessaly that the people would leave if the snakes were not eaten by storks, and that there are large numbers of snakes at certain times in Sparta; Flashar (1972) 79-80 suggests that these reports appeared in sequence in the original Theophrastean text.²⁰¹

²⁰⁰ St. Augustine indeed believed that the earth itself generated frogs when moistened by the rain (*Against Faustus* 6.8, *PL* vol. 42 col.236.10 Migne, cited by Capelle [1955] 174); but that is not the point Theophrastus is making here. *HA* 8.15 600a9 refers to creatures appearing in large numbers after rain when they have previously been in hiding (cf. **366-70** below); but the context suggests that the reference here is specifically to sea-creatures.

²⁰¹ In addition to the parallels in the apparatus, Clement of Alexandria *Protrepticus* 2.39.6 (p. 29.27-8 Stählin-Treu³ = *PG* 8.121A) refers to storks in Thessaly but not snakes. For the hostility between storks and snakes cf. Plutarch *Table Talk* 8.7 727e, Virgil *Georgic* 2.319, Juvenal 14.74. Cf. Wellmann (1916) 28; D'A.W. Thompson

44-50 mice, too, occur in swarms] Rose (1863) 336 notes that the account in Pliny 10.186 is largely based on *HA* 6.37 580b25-8, but that two points in Pliny, that mice appear in drought and that they are destroyed by a grub in their heads, come not from the *HA* but from our Theophrastus text.²⁰² Hughes, 73, notes that Aristotle had observed population crashes among rodents (*HA* 6.37 580b10-29) and compares Theophrastus unfavourably with him in this respect; but he does not note the present passage. Moreover, Aristotle does not attribute sudden decline in numbers to exhaustion of the food supply any more than does Theophrastus, though he does lay more emphasis on the suddenness with which plagues of mice disappear. According to Aristotle only rain can control them, foxes and ferrets (contrast 48 here) not being able to keep up with the rate at which they reproduce.

52-4 mice are recorded as eating both iron and gold] See below, on **359C** 2-6.

55-7 in Egypt mice occur which have two legs] This reference to jerboas, *Dipus aegyptius* (Keller [1909-13] 2.206), repeated in **359B** 11-15, appears at first sight to have little to do with the theme of *swarming* animals; but Aristotle, *HA* 6.37 581a2-5, says that the creatures appear *in large numbers*. As in our present text, Aristotle attaches a reference to exotic "mice" (including, in his case, also the hedgehog-like ones of **359BC**) to a general discussion of the prolific breeding of mice. Jerboas are also mentioned at *HA* 8.28 606b7 (where they are placed in Arabia) in a context concerned with differences in animals according to place.

359B Aelian, *On the Nature of Animals* 15.26 (*BT* vol. 1 p. 384.22-385.19 Hercher)

Rose (1863) 336-7. Lambros (1885) xvi. Keller (1909-13) 2.206-7. A. Steier, 'Maus', *RE* 14.2 (1930) 2399-2400. Flashar (1972) 81-2.

(1936) 128; Flashar (1972) 79. *Jackdaws* are described as attacking *locusts* in Lemnos by Plutarch loc. cit. and, dramatically, by Aelian 3.12, who applies this story to Thessaly too; cf. D'A.W. Thompson (1936) 90.

²⁰² For the grub compare 33-4 above on locusts, and **368** below. "Those who are expert observe this" should rather be translated "Those who are expert keep a look-out for this" (I am grateful to Vivian Nutton for pointing this out); what they keep a look-out for is presumably the external signs of the plague which later internal investigation shows to be caused by the "grub".

It is not immediately clear from the text of Aelian how much of this report is to be attributed to Theophrastus, but there are good arguments for deriving it all from him.²⁰³

1-6 As you go from Susa in Persia to Media] This occurs in *Mirabilia* 27, immediately after a sequence of texts (23, 25-6) linked with **359A**. Rose (1863) 336 suggests that the report in the *Mirabilia* derives via Theophrastus from Amyntas' *Stages*, comparing Aelian 5.14 and 17.17. Flashar (1972) 81-2 accepts both 1-6 and 7-11 of our present text as Theophrastean, and argues that Aelian, who has more detail on the present item than does the *Mirabilia*, is dependent on Theophrastus, even if indirectly, rather than on the *Mirabilia*.

6-7 They also say that the people of Rhoeteum were driven out by millipedes] This is explicitly attributed to Theophrastus by Pliny 8.104, and following him by Petrus Berchorius.²⁰⁴ For *Rhoitiei* Berchorius has *Otreriades*; the MSS of Pliny have *Otreriaeres*, *Otrerienses* or *Otrerietes*, the correct name being restored from Aelian by editors. Rhoeteum is in the Troad, in the north-west of Asia Minor.

7-11 And in Cyrene they say that there are kinds of mice] This occurs in *Mirabilia* 28 (with the same details of one type resembling martens and another hedgehogs), immediately after the information in 1-6 above, and also in **359C** 1-2 (q.v.) The hedgehog-like mice are described in the text of Aelian as having sharp spines; Hercher deleted these words as a gloss, and *may* have been right to do so, though Pliny adds the same explanation both at 10.186 (where he connects the report with Egypt rather than with Cyrene) and in **359C**. Herodotus 4.192, as Flashar (172) 81 notes, distinguishes three types of mice in Libya, "two-footed" mice (the jerboas of 11-15 below), "hill-mice", and the "hedgehog" mice, which Flashar, following Keller and Steier, identifies with *Acomys cahirinus*; he further comments that it is unclear what the broad-faced mice are, though Keller and Steier identify them as *Ctenodactylus Massoni*, a type of jerboa.

²⁰³ What precedes at the end of 15.25, is a citation by name of Aristotle, *HA* 5.14 545b20. 7-15 of our present text are incorporated, from Aelian, in Constantine Porphyrogenitus' *Summary* (Lambros [1885] xvi); see above on **350-383**, Sources.

²⁰⁴ = Pierre de Bersuire; ob. 1362. All Berchorius' references to Theophrastus clearly derive from Pliny; cf. **370A**, **412**, and the commentary on **362F-G**. See Pitra (1852-8) vol. 3 p. lxxviii. I am grateful to Michael Sollenberger for bibliographical help with Berchorius.

11-15] In Egypt I hear that there are two-legged mice] I.e. jerboas. Cf. **359A** 55-7. The words "I have seen these; they are Libyan", deleted by Jacobs, were defended by Rose (1863) 337.

359C Pliny, *Natural History* 8.221-2 (CB vol. 8 p. 101.8-15 Ernout)

A. Steier, 'Maus', *RE* 14.2 (1930) 2406. Steinmetz (1964) 302 and n. 13. Flashar (1972) 80-1.

This text combines two reports: only the second (2-6) is attributed explicitly to Theophrastus, but the first is confirmed as Theophrastean by the parallels with **359B** and the *Mirabilia*.²⁰⁵

1-2 There are several kinds of (mice) in the region of Cyrenaica] This appears, between two items explicitly attributed to Theophrastus, in **359B** 7-11 (q.v), and in a generally Theophrastean context in *Mirabilia* 28.

2-6 Theophrastus states that on the island of Gyara] Gyarus or Gyara is an Aegean island in the Cyclades group; the Chalybes were located on the southern coast of the Black Sea. Similarly, without the places being specified, but with the same detail of cutting up the mice to remove the gold, in **359A** 52-4 above; and in *Mirabilia* 25-6, with the report concerning gold applying to the country of the Chalybes as here,²⁰⁶ but that concerning iron not to Gyara but to Cyprus.²⁰⁷ Aelian 5.14 has the report concerning iron, and cites for it not Theophrastus but "Aristotle"—i.e., presumably, the *Mirabilia*.²⁰⁸ The report also appears, with the place given as Gyarus, in Antigonus 18a, and from him in Stephanus of Byzantium, *Ethnica*, on "Gyarus"; and the statement that mice put the inhabitants of Gyara to flight, though not the report that they then went on to gnaw iron, is re-

²⁰⁵ Against Steinmetz' suggestion ([1964] 302) that 2-6 come from Theophrastus *On things that are Mined* (= *On Metals*; **137** no. 20) cf. Flashar (1972) 80. Its inclusion in **359A** shows that it certainly did appear in the work *On Creatures that appear in Swarms*, and Steinmetz may only have intended to suggest that Theophrastus also repeated it in *On Metals*.

²⁰⁶ But with the erroneous insertion of a reference to an *island*, transferred from the report concerning Gyara; Flashar [1972] 80-1.

²⁰⁷ So at least the MSS; Flashar emends to "Gyarus". He argues ([1972] 43) that it is possible that the place-references go back to Theophrastus, but not certain, given the propensity of the author of the *Mirabilia* to add names (on which see above on **355-8**, ad init.).

²⁰⁸ The MSS of Aelian give the locality as Paros.

ported by Pliny 8.104 from Varro, along with other non-Theophrastean reports of similar events.²⁰⁹ Steier and Flashar note that for mice to eat iron was regarded by the Romans as a portent.²¹⁰

The Plutarch reference in the upper apparatus to 3-6 should be 526B.

CREATURES THAT BITE AND STING

360-1 Rose (1863) 280, 338-352. Wellmann (1916) 34 n. 1, 61. Regenbogen (1940) 1427. Flashar (1972) 41, 141-5, 149-50. Huby (1986) 322-3.

See above, **350** no. 6; and in addition to **360-1** cf. also **355A** 5-10, 28-32, **369**, and above at n. 161 and on **358** ad init.

Sources

Our information on this topic is different in kind from that on the two preceding ones. We have neither a summary of a treatise by Theophrastus (as in **359A**) nor a large number of reports attributed to Theophrastus (as in **355-8**). But there are a number of reports in *Mirabilia* 139-151 which there is reason to connect with Theophrastus' treatise. These are discussed in the commentary below, after **361**. Dittmeyer (1907) 349 and Regenbogen argue that *HA* 8.29 607a20ff. was also based upon it. Priscian of Lydia cites Theophrastus' treatise "on poisonous bites" among his sources in the preface to *Answers to Chosroes* (**350** no. 6b), and discusses the topic in ch.9 of the work.

Doctrine

355A 5-7 contrasts creatures which bite and those which sting, but describes them both as injecting poison into their victims. Priscian, *Answers to Chosroes* 9 (*Suppl. Ar.* 1.2 95.24-6) refers to discussion by "the ancients" of whether reptiles insert venomous fluid (*venenum et*

²⁰⁹ These reports in Pliny come just before that about the people from Rhoeteum and the millipedes (= **359B** 6-7) attributed to Theophrastus. Aelian 11.28 reports that mice drove out the Megarians, where Rose (1863) 337 suggests reading "Gyareans".

²¹⁰ They compare Livy 30.2.10, and Pliny's report just before the present passage of mice foretelling war by gnawing silver shields (8.221).

quandam saniem) into their bites, or rather a “breath” (*spiritus*) and “power” (*virtus*).²¹¹ Constantine Porphyrogenitus’ *Summary*, etc., 1.147 (*Suppl. Ar.* 1.1 35.1-4 Lambros) says that the pain from animals that sting is caused not by anything injected but by the fineness of the sting.²¹² See also below on **361**, **369**. It may be that not all these passages should be traced back to Theophrastus. But it should also be remarked that it is characteristic of Theophrastus’ treatises to present, or refer to, multiple explanations.²¹³ Possibly these various reports reflect different aspects of a more complex original discussion.

On Theophrastus’ treatment of poisoning see also above, n. 5.

360 Apuleius, *Self-Defence* 41 (*BT* p. 48.11-14 Helm, ed. 1959)

Apuleius has described how he has been accused of using fish in magical operations (cf. **351**), but was actually inland at the time. He comments sarcastically that he thus has an alibi for this, but not if he had been accused of crimes involving land-creatures. Nicander wrote a didactic poem on *Antidotes* (and another on *Remedies*, *Alexipharmaca*), probably in the second century B.C. βλητικῶν has been restored by editors in the Theophrastean title from **350** no. 6a and **369**; the scribe of F, the best MS, did not know Greek and was copying Greek uncial characters. Περί βλητῶν καὶ δακετῶν was the title of the treatise by Sostratus (above n. 174).

361 Aelian, *On the Nature of Animals* 9.15 (*BT* vol. 1 p. 223.13-17 Hercher) Rose (1863) 342. Flashar (1972) 142.

According to *Mirabilia* 141 (= Priscian, *Answers to Chosroes* 9 95.30-96.3) the Scythians, to make arrow-poison, cause human blood to decompose by burying it in a vessel in a dunghill, and mix the watery part which stands on the surface with the juice of decomposed snakes which have just borne young. The logic of the Scythians’ method is presumably that the human blood will unite the snake-venom more closely with its human victim. Pliny 11.279 refers to the Scythians

²¹¹ This text is linked with Theophrastus’ treatise by Bywater ad loc., following Rose (1863) 338ff. See above.

²¹² Sauppe, cited by Lambros ad loc., argued that this comes from Theophrastus, because of the use of the non-Aristotelian word *blētikos* (for which cf. **350** no. 6, **360**, **369**). Cf. Huby (1986) 323.

²¹³ Cf. Kidd (1992) 303-4, and below on **383** and **400**.

using a mixture of snake-juice (*sanies*) and human blood as arrow-poison, but without the further details in Aelian and the *Mirabilia*; he does not name Theophrastus, but does in the same context have material from *Mirabilia* 147 (below). Scythian use of arrow-poisons from plants is mentioned by Theophrastus at *HP* 9.15.2. The use of arrow-poison by the Celts is recorded at *Mirabilia* 86, but this is probably not from Theophrastus.²¹⁴

Mirabilia 139-151

Some or all of the following items may derive from Theophrastus' treatise. They are summarised here for the reader's convenience. As noted above, the addition of place-names is a characteristic of this compilation and not to be taken as necessarily reflecting the original source.

139: a type of locust ("in Argos") which fights scorpions; eating locusts is a protection against the sting of scorpions. Similarly Stobaeus *Ecl.* 4.36.24ff. = "Trophilus" fr. 4 Giannini (1966) (cf. below, n. 238).

140: wasps ("in Naxos") sting more painfully when they have eaten adder's flesh. Similar reports, with no reference to any particular place, appear in Pliny 11.281 (immediately before **358**), Aelian 9.15 (in the same context as **361**), and Priscian *Answers to Chosroes* 9 p. 96.7-9. Cf. Kroll (1942) 10.

141 = **361** above.

142: a snake "in Curium in Cyprus" of which the bite has the same effect as the asp's in summer, but no effect in winter, perhaps because the snake is weakened by the cold.

143: an *acherdos*²¹⁵ "in Ceos" whose thorns are deadly. This is the only example of a botanical poison which there is any reason to connect with Theophrastus' treatise; it also appears in Antigonus 18 and Priscian *Answers to Chosroes* 9 96.9-11, connected in both cases with the story that the sting of the sting-ray (*trugôn*, *Trugon pastinaca*

²¹⁴ Perhaps from Timaeus; Flashar (1972) 110.

²¹⁵ Usually a term for wild pear, *Pyrus amygdaliformis*; W.S. Hett in the Loeb *Mirabilia* (Aristotle: *Minor Works*, 1936) translates "a kind of prickly pear", but it is not clear whether he intends by this a reference to the cactus (*Opuntia* spp.) commonly so called.

Cuv.) kills a tree if driven into it.²¹⁶ Rose (1863) 343, followed by Flashar (1972) 142-3, suggests that Theophrastus referred to the plant only as a parallel for the sting-ray.

144: "in Mysia" there are white bears whose breath is so foul that it makes animals' flesh decompose. Similarly, without the reference to Mysia, Pliny 11.277.

145: a kind of hyena in Arabia paralyzes men and animals, including dogs, when it enters into their shadow. Other sources elaborate this; the hyena enters the dog's shadow and thus pulls it off a roof.²¹⁷ Elsewhere it is rather a matter of the hyena bewitching dogs by casting its *own* shadow on them.²¹⁸

146: a creature in Syria called "lion-killer" which is fatally poisonous to lions if it is eaten by them or urinates on them. Similarly Pliny and others.²¹⁹ Rose (1863) 350 notes that in Pliny this item comes in a Theophrastean context, between references to the behaviour of hedgehogs (cf. **362A** 8) and lynxes (ibid. 9-10). Pliny's arrangement is however a thematic one, the common topic being urine.

147: vultures are killed by myrrh and beetles by the scent of roses. (Unusually for the *Mirabilia*, no place-name is given.) So Theophrastus, *CP* 6.5.1 and *On Odours* 4; also in Pliny, Plutarch, Priscian and Aelian.²²⁰ Theophrastus may have mentioned the point also in the treatise *On Creatures that Bite and Sting*, as an example of a natural antipathy.²²¹

²¹⁶ For this cf. Oppian *Halieutica* 2.490-6; the scholium on Nicander *Remedies* 828-36 (p. 291.21-292.10 Crugnola); Pliny 9.155; Aelian 2.36; Julius Africanus, *Cesti*, 2.3.4, p. 203 in J.-R. Vieillefond, ed., *Jules Africain, Fragments des Cestes*, Florence: Sansoni / Paris: Didier, 1970; Manuel Philes *On the Properties of Animals* 106 (p. 44 Dübner). Rose (1863) 343, D'A.W. Thompson (1947) 270.

²¹⁷ *Geoponica* (15.1.10) and Timotheus of Gaza (p. 6.9 Haupt), the latter copied by Constantine Porphyrogenitus, *Summary, etc.* 2.320 p. 100.27ff. Lambros. For *Geoponica* 15.1 see below on **383**.

²¹⁸ Aelian 6.14, attributing the story to "Aristotle" (=fr.369 Rose³); Pliny 8.106; Solinus 27.24 (p. 121.4 Mommsen). Aelian 3.7 refers to the hyena silencing dogs, without mentioning the shadow. Cf. Rose (1863) 348; Keller (1909-13) 1.154; Wellmann (1916) 51, (1928) 49.

²¹⁹ Pliny 8.136; Aelian 4.18; Solinus 27.21 (p. 120.10ff. Mommsen); Hesychius on *lentophonon* (no. 648, vol. 2 p. 584 Latte). In Aelian the report is coupled with the theme of 147 below. Cf. Keller (1909-13) 1.26-7; Wellmann (1916) 61; Steier, *RE* 13.1 (1926) 976f.

²²⁰ Pliny 11.279; Plutarch *Moralia* 1096a; Priscian *Answers to Chosroes* 9 p. 98.3; and, separating the two points, Aelian 3.7 and 4.18 respectively. Cf. also Plutarch *Moralia* 710e and Sextus Empiricus *Outlines of Pyrrhonism* 1.55 (both conflating the two points and making myrrh inimical to beetles).

²²¹ In Aelian 4.18, Pliny and Priscian these reports are coupled with the claim

148: geckoes are poisonous in Sicily and Italy, though not in Greece, and there is a kind of mouse which has a fatal bite. The claim about geckoes appears in *HA* 8.29 607a26, Pliny 8.111 = **362D** 5-6 (see the Commentary there) and Priscian *Answers to Chosroes* 9 p. 97.21-3; that about mice at Aelian 9.15, in the same context as **361**. Keller (1909-13) 2.280 remarked that geckoes are not in fact poisonous, but were still believed to be so in Italy in his time and feared there.

149-50: snakes in Mesopotamia which do not bite the natives but do attack Greeks. Similarly Apollonius 12, Pliny 8.229 and Aelian 9.29. In Apollonius (11) and Pliny this is paired with scorpions in Caria that kill the natives but not foreigners (so too Antigonus 16); for *this* item all three authors cite Aristotle (= fr. 605 Rose³), Apollonius giving the title of the Aristotelian work in question as *Barbarian Customs*. Flashar derives the reports about the snakes in Mesopotamia too from this work rather than from Theophrastus.²²²

151: the deadly sacred snake in Thessaly. Cf. *HA* 8.29 607a30; Priscian *Answers to Chosroes* 9 p. 97.9-13. Flashar (1972) 41 is uncertain as to whether or not this is Theophrastus.

Giannini (1966) 309 and Flashar (1972) 41, 149 also suggest that Theophrastus might be the source of *Mirabilia* 164 (the serpent *sêps* in Thessaly; cf. Nicander *Remedies* 145ff. and the scholium ad loc., (d), p. 86.6-15 Crugnola) and 165 (for which cf. below on **382**). See also below on **362D**.

CREATURES THAT ARE SAID TO BE GRUDGING

362A-I Rose (1863) 280, 353-7. Joachim (1892) 15. Regenbogen (1940) 1427. Kraak (1953) 413-14. Pembroke (1971) 147 n. 111. Flashar (1972) 100. Huby (1986) 320-1. Sharples (1988,1) 52-3. Cole (1992) 57-60.

that oil is fatal to insects, for which see also *HA* 8.27 605b19 and Theophrastus *CP* 6.5.3; Pliny 11.66; Galen, *On the Constitution and Powers of Simple Drugs* 2.20, vol. 11 p. 514.15-17 Kühn); Eustathius *In Hexaem.*, PG 30 956a; Clement of Alexandria *Paedagogus* 2.8.66.1-2 (GCS vol. 1 p. 197.7-12 et. Stählin-Treu³, 1972). Wellmann (1916) 34. This is in fact true, the oil preventing the insects' respiration as Eustathius points out. Cf. A. Ernout and R. Pepin, *Pline l'ancien* vol. 11, CB 1947, p. 142; P. Louis, *Aristote: Histoire des animaux*, vol. 3, CB 1969, p. 181.

²²² Cf. Giannini (1966) 41; Flashar (1972) 144-5.

Sources

Theophrastus' treatise *On Creatures said to be Grudging* (= **350** no. 7) is summarised by Photius in **362A**; the examples in Photius' summary recur in the reports in **362B-I**. On the general character of Photius' summaries of Theophrastean works see above on **345**. The present summary fortunately does not confine itself to the recording of examples, but preserves the overall structure of the treatise: animal behaviour which seems to be motivated by jealousy, begrudging benefits to human beings, is actually to be explained otherwise. None of the other reports make it clear that Theophrastus took this view; some, like **362G**, actually attribute the explanation in terms of grudgingness to Theophrastus himself. See further below.

Huby notes that the topic of psychological qualities shared by animals with man is explicitly raised in *HA* 8.1, but that even where similar examples to those in the present treatise are discussed in *HA* (see below) no reference to jealousy is made.²²³ She therefore argues that the Theophrastean treatise is later than *HA* 8, which would otherwise have used it and discussed the problem more explicitly.

Doctrine

That Theophrastus should deny that the behaviour described is due to grudgingness may at first seem surprising, given his readiness elsewhere to draw parallels between the psychological faculties of human beings and those of other animals; see above at nn. 127ff. Doubts have therefore been raised about whether the second paragraph of **362A** is an accurate representation of Theophrastus' own view. But, apart from the fact that none of Photius' other summaries of Theophrastean works includes extensive comment by himself, it is clear from comparison with Plutarch in **362H** that the second part of **362A** *does* report Theophrastus. It may however be that Theophrastus' dismissal of the explanation in terms of grudgingness was more tentative than Photius suggests; so Regenbogen, who notes (i) that Antigonus 20, introducing the same examples as **362A** 2-8 but citing Aristotle as the source, says that the question whether these phenomena are due to deliberate choice (*prohairesis*) on the part of the

²²³ However, see below on **362A** 16.

animals, or to chance, needs much attention, and (ii) that in **362B** ill-will and natural impulse are presented as alternatives with no indication which is to be preferred.

However this may be, the apparent conflict with Theophrastus' views elsewhere concerning animal intelligence is more apparent than real. For the exclusion of grudgingness in particular as a motive need not exclude the attribution to animals of intelligence in general.²²⁴ Indeed, for animals to be grudging towards humans they would, as is pointed out by Cole, need to have understanding of how and why their various products are useful *to us*.²²⁵ What Theophrastus says in no way excludes their feeling envy for members of their own kind.²²⁶

362A Photius, *Library* 278 528a40-b27 (CB vol. 8 p. 166.18-167.14 Henry)

Joachim (1892) 25-7. H.J.M. Milne, *Catalogue of the Literary Papyri in the British Museum*, London: Trustees of the British Museum, 1927, 132. Regenbogen (1940) 1427, 1430. Kroll (1942) 15-16. Roselli, 'Un frammento dell' epitome Περὶ ζώων di Aristofane di Bizanzio', *Zeitschrift für Papyrologie und Epigraphik* 33 (1979) 13-16. Fortenbaugh (1984) 18-19, 159-161.

[In the following discussion Roman numerals have been attached to the examples cited by Photius, in order to facilitate subsequent cross-reference.]

2-3 (I) the gecko . . . swallows its skin] That the gecko swallows its shed skin²²⁷ because it is useful for epileptics is asserted also in **362B**, **C** and **D**, and in *Mirabilia* 66 in the middle of a sequence (63-7) otherwise concerned with hibernation; see below on **366-70**.

3-5 (II) the stag buries its right horn] So **362C** (explicitly attributing to Theophrastus the view that grudgingness is the motive), **362D** §115 (with further details, including other uses of the horn; see ad

²²⁴ I owe this point to Professor Sorabji.

²²⁵ Cole (1992) 58. Cf. also Huby (1986) 320.

²²⁶ Fortenbaugh (1984) 161. Plutarch, *On envy and hatred* 537b5ff., states his own view that non-human animals may have hatred for each other, but not envy, because they cannot have the necessary *phantasia* of another's faring well or ill.

²²⁷ Photius in **362A** and *Mirabilia* 66 refer to the skin, *derma*, of the gecko, but Photius' *Lexicon* s.v. *hippomanes*, Aelian in **362C** and Antigonius 20 all have *gêras*, literally "old age" but used for the shed skin of reptiles; similarly *senectus* in Pliny (**362D**). See below, on **362B**.

loc.) and **362H**; *HA* 9.5, *Mirabilia* 75, Antigonus 20 (citing Aristotle), Constantine Porphyrogenitus' *Epitome* 2.488 (p. 127.10 Lambros; citing Aristophanes, and clearly from the *HA*, see below) and Photius, *Lexicon*, s.v. *hippomanes*. In *HA* 9.5 611a26 (and in Constantine, contrary to Balme [1991] 241 n.(b)) it is the *left* horn that is said to be hidden,²²⁸ a fact used by Kroll (1942) 10 (cf. id. 16) to demonstrate the dependence of Pliny in **362D** on Theophrastus rather than on the *HA*. Joachim (1892) 26-7 links with these passages *Mirabilia* 5, which refers to deer when shedding their horns retreating for protection into places where they cannot easily be found; see above on **350** no. 11. Theophrastus mentions the horns of deer in another connection, arguing that they have no purpose and indeed are actually an impediment to the deer, at *Metaph.* 9 10b11-14.

5-6 (III) the mare bites off the "mare's frenzy"] The "mare's frenzy", *hippomanes*, is shown by **362C** and **362E** to be a piece of flesh on the foal's forehead. See the commentary on **362E**.

6-8 (IV) when the seal is going to be captured, it vomits up its rennet] The "rennet" is curdled milk in the seal's stomach which contains rennet and was used as such. That it is useful for epileptics is claimed also at *HP* 9.11.3²²⁹ and Dioscorides 2.75.2 (vol. 1 p. 150.21ff. Wellmann); that it was used as a remedy by Serapion is reported, disapprovingly, by Caelius Aurelianus.²³⁰ The seal's behaviour is reported also in **362D** (with the addition of a reference to bile, and not explicitly from Theophrastus, but immediately preceding a reference to him), and in **362H** where the seal is said to *swallow* its rennet.²³¹ On rennet in general cf. Aristotle *HA* 3.21 522b6, and on medicinal uses of the rennet of various creatures and the particular significance of the seal cf. Scarborough (1978) 364-5.

8 (V) the hedgehog makes water on its skin] We are not told here what the skin is allegedly useful for, but Pliny 8.134-5 explains that hedgehog skin with its spines is used for dressing cloth, and says,

²²⁸ Joachim (1892) 27 suggests that this is an error resulting from abbreviation by the compiler (as he supposes) of *HA* 9, the original having had something like "the left horn <is sometimes found, the right horn> never".

²²⁹ Cf. Thorndike (1924) 82.

²³⁰ Caelius Aurelianus, *Chronic Diseases* 1.4.139 = Serapion fr.146 in Deichgräber (1930) p. 166.10; Flashar (1972) 105.

²³¹ *pitua* in **362A** is an alternative spelling for *putia* in **362H**; the word can also be spelled *puetia*.

rather oddly, both that most people do not realise that it has this use, and also that the senate and emperor have repeatedly been concerned with complaints concerning exploitation in the hedgehog-skin trade. Why the hedgehog should be afraid is also unclear from Photius' summary, but Pliny explains that the hedgehog acts in this way when being hunted for its skin, but only as a last resort and usually leaving it too late. The skilful way to catch it is therefore, Pliny says, just after it has made water and thus cannot do so again. The story also occurs, with no more detail than in Photius and without attribution to Theophrastus, in Aelian 4.17, followed as here by the reference to the lynx. Dioscorides, *De materia medica* 2.2, refers to the use of ashes of burnt hedgehog skin as a treatment for alopecia (cf. Riddle [1985] 134 and 137; I am grateful to Pamela Huby for this reference).

Pliny explicitly refers to the hedgehog damaging its spines. For the hedgehog to make water on the spiny skin on its back sounds at first anatomically difficult, but hedgehogs notoriously roll themselves up into balls, which might facilitate the performance (and, together with fright, given as the explanation by Theophrastus in 18-19 below, account for it). Pliny's story may therefore be slightly less bizarre than it seems. Alan Griffiths points out to me that this story is exceptional in that in all the other examples the alleged grudgingness relates to some product that separates from the animal *naturally* (even if, in the case of the seal and its rennet, in a condition of fright), while the hedgehog-skin does not.

9-10: (VI) the lynx conceals its urine, because it is suitable for rings] Amber was believed to be solidified lynx-urine; see below on **362F-G**.

13-14 seeing that the rational ones only acquire it by prolonged study] This might, but need not, be taken as ironical, human selfishness not being a great achievement. For exactly what knowledge is being denied to animals here see above at nn. 224-6.

16 (VII) just like bitches . . . swallow the afterbirth] So too Constantine Porphyrogenitus in his summary of Aristophanes of Byzantium (see above on **350-383**: Sources). This statement also occurs in a papyrus, P. Lit. Lond. 164, which Milne, followed by Pack (no. 1501), thought preserved the original text of Theophrastus; but Regenbogen (1940) 1430 showed that it in fact comes from the original work by Aristophanes which Constantine later excerpted. Cf. also Roselli (1979,

cited above). For mares and deer swallowing the afterbirth cf. *HA* 6.22 577a7 and 9.5 611b24 respectively (in the latter case with the comment that one cannot therefore get hold of it though it is useful as a medicine, but without any explicit reference there to the deer grudging the benefit to mankind).

Alan Griffiths points out that one might expect a second reference to the mare biting off the “mare’s-frenzy” (above, lines 15-16) between the mention of the gecko and that of bitches and sows; it would give a more natural point of reference for the latter comparison. The omission may be due to Photius’ summarising.

20 (VIII) Why does the hen cover itself with chaff when it has laid an egg?] Cf. **362H** 9-10. D’A.W. Thompson (1936) 21; Kraak (1953) 413-14.

21 (IX) Why do dogs lift up their legs when they make water?] *HA* 6.20 574b19-24 goes into more detail; male puppies usually do this from the age of six months, while bitches make water sitting down.

21-22²³² (X) Why, when a goat takes eryngo into its mouth, does it come to a standstill?] Plutarch in **362H** (and in the parallel passages cited in the apparatus there) similarly refers clearly to a goat taking eryngo (*êrunzion*, *Eryngium campestre* L.) into its mouth. However, the transmitted text of *HA* 9.3 610b28ff. refers rather to someone taking hold of the *êrungos* of one of the goats, described as like a hair. de Saumaise, followed by others (including Joachim [1892] 25-6) emended the text of the *HA* to read “when one of them (i.e. the goats) takes hold of the *êrungos*”, corresponding to our text.²³³ But Louis in the Budé edition of *HA*,²³⁴ followed without comment by Balme in the Loeb (vol. 3, 1991, pp. 236-7), retains the MSS reading, interpreting *êrungos* as a metaphor for the goat’s beard. Louis further observes that Pliny 8.204 is aware of both versions, for he says that the herd comes to a standstill (a) if one pulls one goat by its beard, “called *aruncus*” and (b) if one of the herd chews “a certain plant”, which Pliny does not name. See also below on **362H** 12-13.

23 and about the deer too] See above on 3-4. The sex-change from

²³² In our apparatus, the Antigonus reference should be not 115 but 107.

²³³ Cf. also schol. in Nicandri *Theriaca* 645 (a, pp. 240.19-241.1 Crugnola: the passage omitted from the middle of **405B** below), citing Aristotle and emended by Joachim (1892) 26 n. 1 to make it too refer to the plant.

²³⁴ P. Louis (ed.), *Aristote: Histoire des animaux* vol. 3, CB 1969, 71-2 and 183.

stag in 4 to deer in 23 is odd, but it is in the text. The animal is referred to as female in *HA* 9, Antigonus, the *Mirabilia* and Constantine, but as masculine in Aelian 3.17 (= **362C**) and in Photius, *Lexicon* s.v. *hippomanes*.

Of the items mentioned by Photius, (I), (IV), (III) and (II) appear, in that order, in Antigonus 20, attributed to Aristotle. See above, n. 92. (IX) appears in Antigonus 107, in the section of Antigonus' work derived from the *HA* as a whole. In the *Mirabilia* (I) occurs at 66 (see above), (II) at 75, (IV) at 77 and (VI) at 76.²³⁵ Both Antigonus 20 and the *Mirabilia* confine themselves to examples from the *first* part of Theophrastus' discussion as summarised by Photius. Only in (I) and (VI) does the *Mirabilia* imply grudgingness as the motive;²³⁶ Antigonus raises the question of motive explicitly. Several items also appear in *HA*, though chiefly those from the list of inexplicable items in the *second* part of Photius' account: (II) in 9.5 611a26, but without an explicit reference to jealousy;²³⁷ (VIII) in 6.2 560b7-9, (IX) in 6.20 574a17-18, (X) in 9.3. 610b29. (I)-(III) are repeated by Photius in his *Lexicon* entry on *hippomanes* (where, according to Naber, the MSS actually have "Hippostratos", not "Theophrastos").²³⁸

362B Apuleius, *Self-Defence* 51 (*BT* p. 58.6-13 Helm, ed. 1959)

For the context see above on **351**.

1-2 = Rose (1863) p. 237 no. 29.

4 which they shed like old age] Cf. **362A** 2-3, **362C** 2-5, **362D** 3-5. Apuleius speaks of the gecko shedding its skin "like (*velut*) old age (*senium*)". *Senectus* (and *senecta*), which usually mean "old age", are frequently used by Pliny for a shed skin, as in **362D** (cf. Greek *gêras*, as in **362C**; Photius' report in **362A** has rather *derma*²³⁹). But *senium* is not so used; Apuleius' "like" shows that he is using it as simile

²³⁵ Joachim (1892) 15. Steinmetz (1964) 106 and n. 3 notes that the report of (VI) in *Mirabilia* 76 comes from *On Creatures said to be Grudging* rather than from the report of the same topic in Theophrastus, *On Stones* 28; cf. below on **326F-G**. Regenbogen (1940) 1407.

²³⁶ Cf. Rose (1863) 280, Flashar (1972) 41, 104-5.

²³⁷ Cf. Huby (1986) 321.

²³⁸ Cf. also Giannini 392 on the occurrence of (I) and (IV) at Stobaeus *Ecl.* 4.36.25-6 (vol. 5 p. 874.7-13 Hense) and the apparent attribution to Trophilus, on which cf. K. Ziegler, 'Paradoxographoi', *RE* vol. 18.3, at 1161.

²³⁹ I am grateful to Vivian Nutton for pointing this out.

rather than metaphor, but he is also displaying his learning by alluding to the use of *gêras* and *senectus*. *ceterorum* appears to be appositional: "the others, the serpents".

362C Aelian, *On the Nature of Animals* 3.17 (*BT* vol. 1 p. 66.14-30 Hercher)
2-5 = **362A** 2-3; 5-7 = **362A** 3-5; 7-9 = **362A** 5-6. Aelian thus has the same order as **362A**, unlike Antigonus 20.

362D Pliny, *Natural History* 8.111-12 and 115 (*CB* vol. 8 p. 61.21-62.5 and 63.14-23 Ernout)

Joachim (1892) 26-7. Kroll (1942) 10.

1-3 the seal . . . vomits up its . . . rennet] Not explicitly attributed to Theophrastus here, but cf. **362A** 6-8.

3-5 geckoes . . . shed their old skin] Cf. **362A** 2-3.

5-6 the identical bites . . . are those of a poisonous creature in Greece, but are harmless in Sicily] Not given by Pliny as from Theophrastus, but preceded and followed by material connected with him. A similar report appears in *Mirabilia* 148, *HA* 8.29 607a26, Priscian *Answers to Chosroes* 9 p. 97.21-3; see above on **360-1**. These texts all describe the bite as poisonous in Italy or Sicily but harmless in Greece. The MSS of Pliny are corrupt and in any case need emendation. The generally accepted text, followed by Ernout and printed by us, has the bite as poisonous in Greece, harmless in Sicily. Mayhoff's Teubner edition (vol. 2, 1909, p. 116), followed by Rackham in the Loeb (vol. 3, 1940, 2nd ed. 1983, p. 80), emends differently so that it corresponds with the other sources; but Ernout argues that Pliny may himself have been in error.

6-14 Deer, too, have their own form of spite] Not attributed to Theophrastus by Pliny, but cf. **362A** 3-5 and **362H**.²⁴⁰ **362A** does not mention the use of the horn against snakes and epilepsy, but rather "against toad's-poison and for many other things". The usefulness of the horn for epileptics is asserted by Pliny at 28.226, and that burning stags' horn drives away serpents at Pliny 8.118, 10.195,

²⁴⁰ Joachim (1892) 26-7 supposes that Pliny 8.114, on the stupidity of deer and the way in which they swim across the sea, derives from Theophrastus *On the Intelligence and Habits of Living Creatures*; see above on **350** no. 11.

28.149; it is also useful against intestinal worms, Pliny 28.211. Pliny 8.118 is connected by Joachim (1892) 26-7 with *On Creatures that Bite and Sting*; Kroll suggests that Pliny has incorporated into the present passage material that he collected for book 28.²⁴¹

362E Scholium on Theocritus' *Idyll* 2.48-9 (a, p. 280.11-281.4 Wendel)

A.S.F. Gow (ed.), *Theocritus*, Cambridge: Cambridge University Press, 1950, vol. 2 45.

The scholium explains *hippomanes* as the flesh on the foreheads of young foals, used as a love-charm as in **362C** 7-13; Photius, *Lexicon* sv. *hippomanes*, cited in the apparatus to **362A** 2-6 also explicitly refers to *hippomanes* as a charm, *philtron*. *HA* 6.22 577a8-11 describes the growth as slightly smaller than a dried fig, flat, round and black; at 6.18 572a19-21, 27-9 the name is reported as applied rather to a discharge of the mares.²⁴²

However, the scholium is mistaken as far as Theocritus is concerned, for he is explicitly referring to a plant: "*hippomanes* is a plant in Arcadia, at which"—see below—"the foals and mares go mad on the mountains." Gow cites Dioscorides 2.173 for its identification as the caper, *Capparis spinosa* L., and [Dioscorides] 4.80 for its identification as *apokunon*, dogsbane, *Marsdenia erecta* R. Theophrastus, *HP* 9.15.6 says that *hippophaes* (so the MSS) is made from the Arcadian *tithumallos*, spurge, *Euphorbia* L. *hippophaes* appears as the name of a plant, identified as *Euphorbia spinosa* L., at Galen *On the Natural Faculties* 1.13 and Dioscorides 4.159.²⁴³ Gow suggests that *hippomanes* should be read in Theophrastus; but it may rather be that an Arcadian plant correctly called *hippophaes* became confused with the more familiar word *hippomanes*.²⁴⁴

Gow comments of *hippomanes* that "it seems to be connected with some plant having a more or less milky juice, but that is perhaps as far as the evidence permits us to go". LSJ, however, identify *hippomanes* in the Theocritus passage as thorn-apple, jimsonweed, *Datura stramonium*

²⁴¹ Kroll (1942) 16; Flashar (1972) 104-5.

²⁴² Cf. also *HA* 8.24 605a2 with Balme (1991) 189 nn. (b), (c).

²⁴³ So LSJ; cf. Riddle (1985) 123 and 129, who notes however that R.T. Gunther, *The Greek Herbal of Dioscorides*, New York: Hafner, 1934, 556 dissented from the general opinion and identified it as *Hippophae rhamnoides*, sea buckthorn.

²⁴⁴ I owe this suggestion to Robert Temple, who points out that *Euphorbia* would certainly have the effect of driving mares mad.

L., (for which cf. Theophrastus, *HP* 9.11.5-6), with uncertainty as to whether the plant drives horses mad or they like it madly.

The information in this text is also given as from Theophrastus by "Servius Danielis" commenting on Virgil, *Georgic* 3.280. This longer version of Servius is named after its 17th-century editor Daniel; its additions to Servius himself (of which this is one) may be from Adamnan (so, tentatively, Thilo) or be parts of the commentary of Aelius Donatus which Servius himself had not incorporated.²⁴⁵

- 362F** Pliny, *Natural History* 37.52-3 (*CB* vol. 37 p. 56.1-15 de Saint-Denis)
362G Solinus, *Collection of Amazing Facts* 2.38-9 (p. 44.4-14 Mommsen)

Thorndike (1924) 81-2. Jaeger (1938) 116-18; id. 'Diocles of Carystus: a new pupil of Aristotle', *Philosophical Review* 49 (1940) 393-414, at 397-8. D'Arcy W. Thompson, 'Diocles of Carystus', *Philosophical Review* 48 (1939) 210-16, at 212-13. L. Edelstein, review of Jaeger (1938) in *American Journal of Philology* 61 (1940) 483-9, at 484. Caley-Richards (1956) 109-16. F. Kudlien, 'Probleme um Diokles von Karystos', *Sudhoffs Archiv für Geschichte der Medizin* 47 (1963) 456-64. Eichholz (1965) 107-8. Flashar (1966) 56 n. 12. Riddle (1985) 141 and references. von Staden (1992) especially 251-3. Longrigg (1993) 162-4. Sorabji (1993) 46.

Theophrastus discussed the belief that an amber-like stone is formed from solidified lynx-urine not only in *On Creatures Said to be Grudging* (**362A** 9-10 above) but also in the extant *On Stones*, 28. The two discussions overlap, but not entirely. Both mention the burying of the urine, and *On Stones* says that the hardened stone is engraved while **362A** says that it is used for rings. But *On Stones* does not mention the alleged motive of grudgingness,²⁴⁶ and conversely **362A** does not note, as does *On Stones*, the stone's alleged ability to attract objects electrostatically. Both points are present in **362F** and **362G**; but the medical uses mentioned disbelievingly by Pliny in **362F**, and without that qualification by Solinus (third century A.D.) in **362G**, are not mentioned either in *On Stones* or in **362A**, unless concealed

²⁴⁵ So E.K. Rand, 'Is Donatus' commentary on Virgil lost?', *Class. Quart.* 10 (1916) 158-164. Cf. J.F. Mountford, art. 'Servius (2)' in *OCD*² 981.

²⁴⁶ Caley-Richards suggest that Theophrastus, disbelieving the motive of grudgingness, deliberately suppressed it in *On Stones*. Cf. also Ovid, *Metamorphoses* 15.414-15; Flashar (1972) 105.

behind the reference to “other uses” in the latter.²⁴⁷ **362F** gives no clear indication that Theophrastus doubted the alleged motive of grudgingness, and **362G** wrongly suggests that he endorsed it.

Pliny in **362F** does not indeed cite Theophrastus by name for anything more than the ability of the stone to attract objects. Pliny’s whole account is sceptical in tone; he draws a clear distinction between amber and the alleged stone from lynx-urine, and makes it clear that he disbelieves in the existence of the latter.²⁴⁸ Theophrastus, too, in *On Stones* speaks separately of *lyngurium* (28)²⁴⁹ and of amber proper (29), mentioning the power of the latter also to attract things including iron.²⁵⁰ Although Theophrastus in *On Stones* connects amber, rather than *lyngurium*, with Liguria,²⁵¹ it may be that the name *lyngurium* comes from the district and that the story about lynx-urine reflects popular etymology.²⁵²

The reference to Diocles in Theophrastus *On Stones* 28, repeated in our passage, has occasioned much discussion, especially since Jaeger, following Paul Maas, identified the person named as the doctor Diocles of Carystus (= Diocles fr.166 Wellmann) and used the reference in Theophrastus as part of his argument for the dating of Diocles. Jaeger noted the references to medical usages of the stone in the present passage, and used them to argue for his identification of Diocles even while recognising that they are not present in the text of *On*

²⁴⁷ Jaeger (1938) 117-18 conjectured that the medical information in **362F** 9-11 indicates a direct use of Diocles by Pliny’s source without reference to Theophrastus for *this* material. It could also have been derived from *On Creatures said to be Grudging*, if Theophrastus’ original account was fuller than Photius’ summary in **362A** 9-10. But it is perhaps most probable that it simply reflects Pliny’s rearrangement and combination of material from different sources; see above on the medical uses of stag’s-horn in **362D**.

²⁴⁸ At 28.122 Pliny speaks of lynx-urine as a remedy for epilepsy, but without mentioning its alleged forming into a *stone*. At 37.34 he cites one Demonstratus on the subject of *lyncurium*; cf. M. Wellmann, art. ‘Damostratus (5)’, *RE* 4.2 [1901] 2080-1). Demonstratus or Damostratus, like Theophrastus *On Stones* 28, distinguishes between the stone from the urine of male and female lynxes; but he speaks of differences in colour, while Theophrastus just says that from the male is better. Theophrastus in *On Stones* also says the stone from wild lynxes is better than that from tame ones, which Demonstratus does not.

²⁴⁹ Cited by Pliny 37.33 = **209** no. 8.

²⁵⁰ Eichholz suggests Theophrastus’ *lyngurium* is in fact yellow or brown tourmaline; Caley and Richards however rejected this and suggest that Theophrastus’ *lyngurium* and amber proper are in fact two different types of amber.

²⁵¹ Cf. Strabo 4.6.2. Eichholz (1965) 108; Riddle (1985) 141.

²⁵² Steier, art. ‘Lynx’, *RE* 13.2 (1927) 2475-6.

Stones itself.²⁵³ But this has generally been found unconvincing; Thompson and von Staden note that these two passages would be the only evidence for the doctor Diocles having any interest in minerals. And Thompson, Edelstein, Kudlien, Flashar and von Staden have all emphasised that, while Pliny here refers dismissively to “a certain Diocles”, in 26.10 he holds the doctor Diocles in honour. Jaeger was aware of this, and tried to explain the discrepancy by Pliny’s general disbelief in the whole story and by the fact that the point for which he found Theophrastus citing Diocles by name is not a medical one. But we must surely accept Edelstein’s conclusion that *Pliny* at any rate did not take the Diocles referred to here to be the doctor.

Eichholz argues that the reference to Diocles with no further identification suggests that it was the doctor that Theophrastus himself in *On Stones* had in mind; he further notes that Diocles studied the urinary tract.²⁵⁴ Kudlien however argues that the reference may be to another Diocles altogether, noting the Diocles who was freed by Strato and the one who was executor of his will, if indeed they are different (Strato fr. 10 Wehrli; Diokles no. 51 in *RE*) and the writer cited at Olympiodorus, *On Aristotle’s Meteorology* 30.8. Von Staden comprehensively demolishes Jaeger’s arguments for dating Diocles of Carystus after Aristotle and seeing Peripatetic influence on him; and Longrigg (1993) 162-4 agrees with Edelstein’s view that Diocles of Carystus was a contemporary of Aristotle and Aristotle was influenced by Diocles on medical matters.

Whereas Pliny in **362F** refers to the stone as a remedy for bladder-stone and jaundice, Solinus in **362G** refers to kidney stone and jaundice, and Marbod (app. to **362G**) to stomach-ache and jaundice. Burnett argues that Marbod derives from Solinus rather than from Pliny.²⁵⁵ Marbod does indeed link Theophrastus with the colour and electrostatic properties of the stone, like Pliny in **362F**, rather than with the motives of the lynxes, like Solinus in **362G**. But Marbod may simply have read Solinus with a full stop before, rather than after, “as Theophrastus says”, and generally his language is closer to Solinus than to Pliny.²⁵⁶ That the lynx grudges its urine to men and

²⁵³ See above, n. 247.

²⁵⁴ Galen, *On the Natural Faculties* 1.13.

²⁵⁵ C. Burnett, ed., *Hermannus de Carinthia: De essentiis*, Leiden: Brill, 1982, 326. Cf. also Pitra (1852-8) vol. 3 lxxi.

²⁵⁶ Marbod does, unlike Solinus, specify what the stone attracts—chaff, *paleas*. But this is not Pliny’s word (he has *stramenta*), and Marbod does not mention the plates of iron.

so hides it is also reported by Petrus Berchorius (cf. above on **359B**), *Reductorium Morale* book 10 ch. 61 (p. 379 of the Cologne edition of 1731) citing both Pliny and Isidore; he does not mention the medical uses of the stone, but does add the detail that the covering of the urine with earth makes it turn to stone all the quicker, and, in keeping with the general moralising purpose of his work, compares the lynx to God the Father, the urine to the eternal Son, the earth to the Virgin Mary and the stone to Christ incarnate.

- 362H** Plutarch, *Table-Talk* 7.2.1 700CD (*BT* vol. 4 p. 217.15-218.7 Hubert)
362I Scholium on Homer's *Odyssey* 23.167 (vol. 2 p. 719.2-5 Dindorf)

Rose (1863) 264. A.J. Kronenberg, 'ad Plutarchi Moralia', *Mnemosyne* 52 (1924) 61-112, at 83. P. Louis, ed., *Aristote: Histoire des animaux*, vol. 3, *CB* 1969, 71 and 183.

1-7 the so-called "hoofstruck" man] Plutarch explains Plato's metaphorical use of "hoofstruck" for a stubborn man by referring to a belief that grain struck by the hooves of the oxen becomes hard and infertile. He then cites Theophrastus as refusing to give an explanation, in the same context ("among these", line 13) as other things which we cannot explain (9-13). All Plutarch's examples of the latter here occur also in **362A**. It thus seems likely that the hoofstruck grain was discussed there too and that Photius has omitted it from his summary in **362A**. True, it does not necessarily follow from Plutarch's words that the hoofstruck grain and the other examples were discussed in one and the same single treatise. But even so, **362H** 9-13 serves to establish that the examples in the second part of **362A** were discussed by Theophrastus, as well as those in the first.

Plutarch presents Theophrastus as declining to explain the phenomenon of hoofstruck grain, but not as doubting its very occurrence. It is therefore striking that Theophrastus himself, referring to the belief as that of *hoi polloi* at *CP* 4.12.13, seems to reject it altogether.²⁵⁷ **362I** could derive either from *On Creatures Said to be Grudging* or from *CP* 4.12.13, if it has simply omitted the scepticism of the latter.

Einarson-Link in the *CP* passage render *kerasbolon* by "hoofstruck"; E.L. Minar in the Loeb Plutarch (*Moralia*, vol. 9; 1961) has rather

²⁵⁷ The belief occurs also, as Rose (1863) 356 and Einarson-Link (1976-90) vol. 2 p. 333 n. 2 ad loc. note, at *Geoponica* 2.19.4 (p. 59.11-15 Beekh) and 15.1.27 (p. 435.15-17 Beekh; for the latter section of the *Geoponica* cf. below on **383**).

“horncast”. *keras* is used of hoofs by Longus,²⁵⁸ and reference to hoofs makes much better sense, especially in **362I** where it would be odd for seed thrown *down* to strike the oxen’s horns. Moreover, a reference to hoofs makes the example more like the others in 9-13, for they all involve the animals *doing* something; treading on corn thrown down may not be a deliberate action, but it involves the ox more than would the entirely passive role of having the grain strike against its horns.

8 Theophrastus shunned the explanation] This is an emendation by Kronenberg²⁵⁹ for “Theophrastus hinted at the explanation” of the MSS. The second paragraph of **362A** stresses inability to give a full explanation even in those cases where it does make some sort of suggestion; and for Theophrastus’ emphasis on the limits of explanation cf. **159** and the Commentary there.

9-10 hens cover themselves with chaff] See above, on **362A** 20.

10-11 the seal which swallows its rennet] See above, on **362A** 6-8.

11 the horn which is buried by the stags] See above, on **362A** 3-5.

12-13 and the eryngo] See above, on **362A** 21-22. The scholium (b) to Nicander, *Remedies* 645 explicitly cites Plutarch for this, but is based, as Crugnola points out ad loc., *not* on *Moralia* 700CD, our passage, but on 776F, where Theophrastus is not named. This is shown by its adding that the effect lasts until the goatherd removes the herb, a point which occurs in Plutarch 558E and 776E but not in any of the other passages on this topic.²⁶⁰

FISH FOUND IN DRY PLACES

363-4 Edited by Wimmer (1866) 455-8 and (with English translation and commentary) in Sharples (1992,2). See Rose (1863) 280. Joachim (1892) 15. Regenbogen (1940) 1428. Kroll (1942) 11. Flashar (1972) 41, 102-4. Sharples (1984), (1988).

²⁵⁸ *Daphnis and Chloe* 2.28; though it must be admitted that he refers to τοῖς κέρασι τῶν χηλῶν, “the horny substance of the hoofs”, which is less abrupt than using *keras* alone of hoofs.

²⁵⁹ Based on *dedittomenoi*, suggested by Emperius.

²⁶⁰ Cf. Rose (1863) 264. This Nicander scholium goes on to cite Theophrastus himself immediately after, but for a different point (= **413** no. 58).

Sources

On the scope and title of Theophrastus' treatise on fish found in dry places, preserved in MSS with the title *On Fish* but cited by ancient authorities variously as *On Creatures that Remain on Dry Land*, *Spend Time on Dry Land* or *Live on Dry Land*, see above on **350** no. 8. *Mirabilia* 71-4 and Pliny 9.175-8 are related to the work.²⁶¹ Regenbogen argues that our MS text has suffered omissions, but there is little to suggest this; he notes **217** (cf. below on **363** no. 3) and the reference to tortoise eggs in Pliny 9.177 = **363** no. 5), but the former may come from *On Waters* rather than from *On Fish*, and the latter may be Pliny's own addition.²⁶² See also below on **364**, and on the question whether the extant treatise was one part of a larger work on fish see above on **350** no. 8. Senn (1933) 98, (1956) 65 argues that *On Fish* was an early work, because it employs Aristotelian assumptions about the cooling of animals, but this reflects his general and questionable supposition of a progressive shift away from Aristotle in Theophrastus' views.

Doctrine

Theophrastus' treatise considers two groups of phenomena; sea-creatures that emerge from the sea and move around on dry land, and those that burrow into, or (Theophrastus claims) are generated in the earth. He is concerned to explain these cases of creatures being found outside their natural habitat, and attempts to do so within the context of established Peripatetic concepts.²⁶³ The sea creatures that come onto land are explained as dualizers (*epamphoterizontes*), and in some cases their behaviour is explained by their needing less cooling and so being able to survive out of water; it is the sea creatures that

²⁶¹ Aristotle (presumably the *Mirabilia*), Theophrastus and Polybius (34 fr.10 Hultsch = Athenaeus 8.332AB) are referred to in general terms for fish dug out of the ground by Cornelius Agrippa (1486-1535), *De occulta philosophia* 1.10 p. 14 (ed. 1533, reprinted Graz: Akademische Druck, 1967).

²⁶² See below. Kroll (1942) 11 suggests that Pliny 9.76, which refers not only to morays coming onto dry land (as in *HA* 5.10 543a29 and Theophrastus *On Fish* 4-5) but also to their copulating with snakes there (as also in Aelian 1.50), derives from Theophrastus; but this is uncertain, whether or not one accepts Kroll's alternative suggestion that it might be an elaboration of *HA* 5.4 540a33.

²⁶³ Cf. Sharples (1992,2) 347-8, 356-8.

actually take in air for cooling as an alternative to water, Theophrastus says, that are the really remarkable ones. As for the fish that burrow into the earth, these clearly do have water as their natural element.

For creatures out of their natural habitat cf. also **218A** (mice in a spring in Arcadia) and the Commentary there; for creatures that hide, **366-70**, and for spontaneous generation, **383**.

363 Passages in Theophrastus' work *On Fish (that live on dry land)* to which later authors refer mentioning Theophrastus by name

1 *On Fish* 2] Aelian 5.27, etc.

This passage is also echoed in *Mirabilia* 72; and material from §§1-2 may be reflected, without Theophrastus being named, in Pliny 9.71.²⁶⁴

2 *On Fish* 4] Athenaeus 7.90 312B, 7.104 317F = **365B**

Athenaeus 7.90 312B, on eels, cites Theophrastus accurately, and gives the reference as "the fifth book of Theophrastus *On (Creatures) that spend time on dry land*"; Casaubon, followed by Schneider,²⁶⁵ deleted the book number. Joachim (1892) 6 argues for its retention on the grounds that *On (Creatures) that remain on dry land* (= **350** no. 8) is the fifth in Diogenes Laertius' list of Theophrastean zoological works that *may* reflect the contents of a multi-book treatise *On Living Creatures* (see above on **350** no. 1). Cf. Sharples (1992,2) 351 and n. 15.

In **365B** below Athenaeus cites our treatise, under its alternative title of *On Creatures that Live on Dry Land*, for octopuses not taking in sea-water.²⁶⁶ But he then goes on to cite a *different* treatise of Theophrastus, *On Differences with regard to Locality*²⁶⁷ for cold and less salty water as the reason why octopus are not found in the Black Sea.²⁶⁸ This statement too occurs in *On Fish* §5; so it seems that, as often, Theophrastus mentioned the same point in a slightly different way in different treatises.²⁶⁹

²⁶⁴ Kroll (1942) 11.

²⁶⁵ Schneider (1818-21) vol. 4 p. 803.

²⁶⁶ Cf. Aristotle, *On Respiration* 475b5ff.; more accurately, they do so, but only incidentally in the course of feeding, not for cooling: Aristotle *On Respiration* 476b30ff., *HA* 8.2 589b20-22.

²⁶⁷ See **350** nos. 3-4 and **355-8**.

²⁶⁸ Cf. D'A.W. Thompson (1947) 207.

²⁶⁹ So, of this passage, Joachim (1892) 24.

3 *On Fish* 7] Athenaeus 8.2 331C etc.

In *On Fish* §7 (reflected in *Mirabilia* 73) Theophrastus refers to fish near Heracleia which burrow underground when their rivers and pools dry up. The Theophrastus passage is reported by Pliny 9.176, who says that the fish make themselves caverns in the ground and live in these: "Around Heraclea and Cromna and in many places in the Black Sea region there is one kind which pursues the last waters of the rivers and makes hollows for itself in the ground and lives in these, even when the rivers retreat and the shore dries up. So they are dug up, the movement of their body showing that they are still alive."²⁷⁰ From Pliny, Thomas of Cantimpré (13th century A.D.) developed the point by saying that the fish pursue water by digging into the ground *between* rivers, and, "marvellously", make such efforts that *they travel from one river to another*: "The Heracliodes fish are in the region of Heraclea on the Black Sea, as Theophrastus writes. This kind pursues the last waters of the rivers by hollowing out the ground in the middle between rivers, and this is remarkable, that it undertakes so much labour that it changes one river for another. For it makes hollows for itself in the ground so that it can live there as the rivers retreat" (or "by exchanging one river for another").²⁷¹

Thomas, in turn, was the source of Albertus Magnus,²⁷² who makes the story yet more elaborate by saying that the fish travel (underground) from one watery place to another and hide *in underground caverns where subterranean rivers meet*: "The Heracleides fish, as Theophrastus says, dwell in the Black Sea region around Heraclea. This fish follows fresh water very much, in that it digs into the earth and passes from one water to another, and sometimes hides in hollows (or "caverns") where it has found underground rivers flowing together."²⁷³ The elaboration may well have been suggested by Thomas' placing

²⁷⁰ *circa Heracleam et Cromnam et multifariam in Ponto unum genus esse quod extremas fluminum aquas sectetur cavernasque sibi faciat in terra atque in his vivat, etiam reciprocis amnibus siccato liore, effodi ergo motu demum corpore vivere eos adprobante.* Regenbogen (1940) 1428 and Kroll (1942) 11 argue that the reference to Cromna has simply fallen out of our text of Theophrastus; Flashar (1972) 103 that it is rather an addition by Pliny.

²⁷¹ *Eracliodes pisces sunt circa eracliam Ponti, sicut Theophrastus scribit. hoc genus extremas fluminum aquas sectetur cavando terras que medie sunt inter flumina, et hoc mirum quod tantos labores assumit ut aquam contrariam mutet. facit etiam sibi cavernas in terra ut ibi vivat reciprocis amnibus.* Thomas of Cantimpré, *On the Nature of Things* 7.36 (p. 262.24-8 ed. H. Boese, Berlin: De Gruyter, 1973).

²⁷² So Stadler (1916-20) 1533 (see the next note), ad loc. For Albert see above on 354.

²⁷³ *Eraclaydes ut dicit Theophrastus pisces sunt in ponto circa Eracliam morantes. hic piscis*

of the phrase “*reciprocis amnibus*”; this is taken from Pliny, but in Pliny’s version it appears earlier, and relates to the rivers’ drying up as the cause of the fish burrowing into the soil in the first place. What Thomas understood by the words is not entirely clear; but it looks very much as if his placing them at the *end* of his account led Albert to take them as referring to the situation of the fish when they were already underground, and so to his reference to subterranean rivers *meeting* in the underground caverns.

Moreover, Theophrastus is cited for fish that are found underground and dug up by Seneca, *Natural Questions* 3.16.5 = **217**, at the end of a highly rhetorical passage about vast underground caverns and the sightless creatures that live in them. Albert cites the whole of Seneca *Natural Questions* 3.16.4-5, and attributes it *all* to Theophrastus, in his *Meteorology*.²⁷⁴ It seems possible that a reminiscence of the Seneca passage, too, may have encouraged Albert in his further elaboration of the material from Thomas of Cantimpré.

4 *On Fish* 8] Athenaeus 8.2 331C, etc.

Theophrastus here refers to fish that are frozen solid in the ice and only move when thawed by being cooked. Cf. also *Mirabilia* 63, and below on **366-70**. For frozen fish see also **175**, where they are said to shatter when dropped.

5 *On Fish* 9-10] Pliny 9.177

At *On Fish* §9, Theophrastus refers to the *kentriskos* fish which develops underground in the region of Heracleia²⁷⁵ and then (§10) mentions fish which come out of the sea on to the land to look for food. Pliny wrongly conflates these two types, which Theophrastus’ argument expressly distinguishes. Nor is it clear that Pliny’s reference to *eggs* in connection with these fish represents Theophrastus accurately. At the end of §8 he refers to the river water leaving behind, in some places eggs, but in others “principles” (*archai*) from which generation takes place. He then seems to explain the latter by reference to spon-

multum sequitur aquam dulcem, ita quod terram fodiens de aqua transit ad aquam et aliquando in cavernis latitat ubi amnes subterraneae confluere invenerit. Albert, *On Animals* 24.52, vol. 2 p. 1533.32-5 Stadler (Münster: Aschendorff, 1916-20).

²⁷⁴ Albert, *Meteorology* 2.2.9 (vol. 4 p. 533a36-b11 ed. Borgnet); I am grateful to Pamela Huby for drawing my attention to this passage.

²⁷⁵ Perhaps we should read, with Schneider, *kestriniskos*, the diminutive of *kestrinos*, mullet. See Sharples (1992,2) 379.

taneous generation (“not from living creatures”), and to relate the *kentriskos* to this; though the text seems faulty, and eggs *are* referred to later in §9.

Pliny further refers to the fish walking on their gills to seek food. Theophrastus in *On Fish* §10 simply mentions the *narrowness* of the gills, to explain that the fish in question can survive out of the water, because they do not need much cooling; but in §2 (reported by Pliny just before at 9.175) he has mentioned fish in the region of Babylon that search for food by walking on their gills, and Pliny is right to relate §10 to this.

Pliny’s final reference to tortoise eggs as an example of eggs maturing in a dry place is not in the text of Theophrastus. Kroll 11 suggests either that our text of Theophrastus is defective or that the reference to tortoise eggs is owed to an intermediate source; but it could be Pliny’s own.

6 *On Fish* 11] Pliny 9.178

Pliny ridicules Theophrastus for suggesting fish might be found in wells; this is not in fact something that Theophrastus himself says (unless our text of *On Fish* is defective), but Pliny’s inference as to what his account might imply.²⁷⁶

364 Theophrastus, *On Odours* “section 70” (p. 376.30-2 Wimmer, ed. 1866) Steinmetz (1964) 386. Eichholz (1965) 14 n. 3.

This is the first of two disjointed fragments (the other being **200**) transmitted at the end of Theophrastus’ treatise *On Odours* (= **384** no. 2g). If it came from *On creatures that remain on dry land* it would appear that our MSS text of that work is incomplete; but it may rather belong to *On things turned to stone* (= **137** no. 23?; see the Commentary there.) This might be easier if the fish in question were fossils; but Steinmetz 306 suggests that the reference might be to a *live* coral. The expression “which have grown inside” suggests a connection with Theophrastus’ interest in spontaneous generation, for which cf. **363** no. 5 and **383**.²⁷⁷

²⁷⁶ Kroll (1942) 11, however, suggests that the reference might be due to a later source, and cites Regenbogen as suggesting (in a personal communication) Alexander Polyhistor, cited at Pliny 9.115.

²⁷⁷ For coral cf. *On Stones* 38 and *HP* 4.7.1-2 with **413** no. 44; D’A.W. Thompson (1947) 125-7.

CREATURES THAT CHANGE COLOUR

365A-D Rose (1863) 280, 362-5. Joachim (1892) 15, 36. Wellmann (1916) 40-42. Röhr (1923) 58. Regenbogen (1940) 1428-9, 1445, (1956) 447-8. D'A.W. Thompson (1947) 206. Flashar (1972) 40, 82. Fraser (1972) vol. 2 643. Huby (1986) 319, 324 nn. 20-1. Battezzato (1993) 222. Sorabji (1993) 55.

Sources

Theophrastus' treatise *On Creatures that Change Colour* (= **350** no. 9) is summarised by Photius in **365A**; on the general character of Photius' summaries see above on **345**. Photius' summary mentions three creatures, the octopus, the chameleon, and the *tarandus*; it devotes most space to the exotic *tarandus*, and says very little about the octopus at all.²⁷⁸ Fortunately Theophrastus' account of the octopus can be supplemented from **365BC** and possibly **365D**; see further below. These three examples do not seem much for an entire treatise; but there is no certain evidence to show that any more were discussed in the original work. Regenbogen (1940) 1445 indeed suggests that Antigonos 26, where the plant *tripolion* (sea aster, *Aster tripolium* L.) is said to change colour three times a day, derives from this work as well.²⁷⁹ Regenbogen also suggests ((1940) 1429) that Theophrastus in this work may have dealt with changes in colour in fish, comparing *HA* 8.30 607b11ff. This indeed refers to *seasonal* changes rather than to the rapid ones of the chameleon and octopus to match their background, but see further below.

However, it is striking that Philo Judaeus, *On the Drunkenness of Noah* 172-4, lists four examples of creatures changing colour; the chameleon and octopus (172), the dove's neck which appears to change colour as light falls on it from different angles (173), and the *tarand(r)os* (174). The whole passage, as Colson and Whitaker (1930) vol. 3 506 point out, is ill-suited to its context, which is one of arguments for scepticism; the example of the dove's plumage was a common one (e.g. Lucretius 2.801ff.) and is different in kind from the others, there being

²⁷⁸ Regenbogen (1940) 1429 suggests that this is because the colour changes of the octopus were so familiar.

²⁷⁹ Huby (1986) 324 n. 20 is doubtful. Cf. also Dioscorides 4.132 (vol. 2 p. 277.8-10 Wellmann) and Pliny 21.44. Scarborough (1992) 167 n. 69.

no change in the creature itself. It then seems a striking coincidence that the remaining examples in Philo should be just those three which Photius cites from Theophrastus. The same three creatures are indeed mentioned in Antigonus 25 (below), but Philo's account of the *tarandos* is clearly dependent on Theophrastus rather than on Antigonus, being much fuller than the latter and containing close verbal parallels to Theophrastus as summarised by Photius. So the suspicion must arise that Theophrastus is the ultimate source of section 172 of Philo as well, and that the reason that just these three creatures are mentioned by Philo is that they were indeed the only ones Theophrastus mentioned.²⁸⁰ Both Philo and Antigonus indeed refer only to the creatures taking on the colour of their locality, with which cf. **365A** 2-3, without mentioning the chamaeleon's changing of its own accord as in **365A** 7, or the explanation of changes of colour by "breath", *pneuma*. But this could be explained by Philo or his source using only the opening part of Theophrastus' treatise. Philo says that nature has given the changes of colour to the chamaeleon and octopus as protection against capture; Antigonus mentions difficulty of capture only in the case of the octopus.

The description of the *tarandos* occurs also at *Mirabilia* 30. Antigonus 25 describes the octopus, chameleon and *tarandos*, and explicitly refers for the third, only, to "Aristotle"—i.e., presumably, to the *Mirabilia*. There is no separate mention of the octopus or the chamaeleon in the *Mirabilia*, but the *tarandos* is contrasted with them explicitly in the same way that it is contrasted with "the other creatures" in **365A** 16ff.; which may suggest that the *Mirabilia* is in fact drawing on Theophrastus' treatise and, naturally enough, includes only the most "remarkable and almost incredible" example. Huby (1986) 319 notes

²⁸⁰ John of Damascus' account of the *tarandos* in his *Sacred Parallels* (*PG* vol. 95 1584B) is verbally identical to Philo's, and must derive either from him or from a common source; that the former is the case is suggested both by the fact that no other extant text (apart from the excerpts from Philo by Herennius; see Cohn-Wendland [1896-1915] vol. 2 ad loc. and xxviii) corresponds to these as closely as they do to each other, and by John's explicit mention of his use of Philo as a source (*PG* 95 1041B, 1044B; D.T. Runia, *Philo in Early Christian Literature: A survey*, Assen: van Gorcum and Minneapolis: Fortress Press, 1993, 355). John does indeed also mention the octopus and the chamaeleon; but he does so in sections of his list of creatures which are far removed from the reference to the *tarandos*, at 1573C and 1581D respectively, and his account of each has features not paralleled in Philo; the octopus is described purely in terms of clinging to rocks to catch other fish, and the chamaeleon is said to turn to all colours except white, while Philo does not mention any such restriction (compare however **365A** 5-6).

that the *tarandos* is absent from *HA*, and that the octopus is dealt with only briefly at *HA* 9 622a8-13; she therefore suggests that the Theophrastean treatise was later than *HA* 9.

The change of colour of the chameleon is described in two Aristotelian passages. At *PA* 4.11 692a20 it is described as due to fear, and explained physiologically by a process of cooling, the creature having little blood (cf. Fortenbaugh [1971] 156). In *HA* 2.11, on the other hand, the change of colour is linked with the creature's inflating itself, and there is no reference to fear. The creature's functioning with its breath even after being cut open is mentioned later in the chapter, but there is no explicit link between the amount of breath in the creature and its change of colour, as there is in **365A** and **365D**. In general, the account in *HA* 2.11 reads like a detailed report of a dissection with little overt theoretical content.²⁸¹

Regenbogen and Düring regarded *HA* 2.11 as a later Theophrastean intrusion into the *HA*.²⁸² Peck however argued that it is unlikely that it comes from Theophrastus *On Creatures that Change Colour*, since it is concerned with many features besides colouring.²⁸³ Moreover, *HA* 2.11 does not contain the details in **365A** 5-8 concerning the chameleon's changing to match its surroundings and its not changing to white or red. Pliny 8.122 incorporates these details, preceded by a reference to the creature's feeding on the air, into an account otherwise based on *HA* 2.11.²⁸⁴ In Pliny as in Antigonius 25 (above) the description of the chameleon is immediately followed by that of the *tarandus*, from which Kroll concludes that Antigonius 25 and Pliny had a common source which already combined Aristotelian and Theophrastean material. Neither Pliny nor Antigonius has the connection of the change of colour with breath, which comes *later* in **365A**, in 22-5 as opposed to 5-8. See further below.

At **359A** 31-2 the colour of locusts is said to be affected by their food. For sheep changing colour through drinking particular waters see **218** and commentary.

²⁸¹ I am grateful to Robert Temple for emphasising this to me. Düring (1966) 508 interprets *HA* 2.11 as making the change of colour deliberate; but that is an argument from silence rather than something stated in the text. It should however be emphasised that the *HA* account is not in conflict with that in the *PA*, only more restricted in its scope; I am grateful to Pierre Pellegrin for pointing this out.

²⁸² Regenbogen (1940) 1429 and (1956) 447-8; Düring (1966) 508.

²⁸³ Peck (1965) 238-9.

²⁸⁴ Rose (1863) 362, Kroll (1942) 13-15. See also below on **365A** 22-5.

Doctrine

"Breath", *pneuma*, is connected with the colour changes of the chameleon in **365A** 22-5 and in **365D**, and with those of the octopus in **365C** (where the translation "air" is simply to avoid the oddity of describing an octopus as breathing). Both passages mentioning the chameleon refer to the amount of its body taken up by its lungs as evidence for the amount of "breath" in it. "Breath" is important in physiological explanation elsewhere in Theophrastus; cf. above, n. 4. The *tarandos*, whose change of colour is in hair rather than skin, is described as a special case at **365A** 19-21, and the explanation in terms of "breath" presumably does not apply to it; though it may be noted that what **365A** explicitly excludes is not a change due to "breath" but a change due to alteration ["alternation" in the first impression of the text-and-translation volumes is a misprint] of the internal moisture or fluid (*hugrotês*).²⁸⁵

What is less immediately apparent from the sources is Theophrastus' view on the reasons for the changes of colour of the octopus and chameleon, and in particular whether these are deliberately brought about by the creature itself, or rather an automatic psychological reaction. The question is all the more important because of its bearing on the general issue of Theophrastus' views on animal intelligence (see above on **350-383**: Doctrine, and on **362**).

Aristotle in *PA* 4.11, as we have seen, explained the chameleon's change of colour as a physiological reaction due to its lack of heat. But he also identified this with the creature's fear (strictly, its material aspect); clearly, the psychological reaction of fear is being linked with a physiological one, much as Aristotle and Theophrastus connect anger with the seething of blood around the heart as its material cause.²⁸⁶ It is natural to see Theophrastus' explanations in terms of breath as modifications of an essentially similar position.

Plutarch in **365D** draws a contrast between (I, lines 1-6) the chameleon and (II, lines 6-9) the octopus. He argues that the octopus changes colour deliberately both for protection and in order to hunt

²⁸⁵ Moisture and "breath" appear as alternative explanations of perspiration at the opening of *On Sweating* (above, n. 4).

²⁸⁶ Aristotle, *On the Soul* 1.1 403a31; Theophrastus, *On Sweating* 36, the latter also linking fear and the departure (*metastasis*) of heat. For the connection between coldness and fear see *PA* 2.4 650b28ff., 3.4 667a15ff., 4.5 679a25 (of the octopus and similar creatures). I am grateful to Bill Fortenbaugh for the reference to *On Sweating*.

other creatures, not mentioning fear; no connection is drawn between the change of colour of the octopus and breath or coldness. The account of the chameleon, however, falls into two sections. First we are told (Ia, lines 1-3) that it changes colour through fear. The contrast with the octopus suggests that this is involuntary change through fear rather than change for the sake of protection. This is then connected to the large amount of breath in the creature (Ib, lines 3-6). It is only for (Ib) that Theophrastus is explicitly cited; and (Ib) corresponds with **365A** 22-5. There is no reference to the chameleon's *fear* in **365A**; but **365A** is only a summary.

The question thus arises, firstly whether (Ia) as well as (Ib) represents Theophrastus' doctrine, and secondly whether (II), on the octopus, does so too.²⁸⁷ On the first question, it may be observed that Plutarch does not explicitly attribute (Ia) to Theophrastus, and that (Ia) has no counterpart in **365A**.²⁸⁸ Indeed, Düring and Fortenbaugh say that **365D** is evidence for the explanation of the chameleon's change of colour in *HA* 2.11 (above) being Theophrastean; since the *HA* 2.11 explanation, by contrast with that in *Parts of Animals* 4.11, does not mention *fear*, it seems that they are supposing that Plutarch attributes only (Ib) and not (Ia) to Theophrastus.²⁸⁹

As for what Plutarch says about the octopus in the second part of **365D**, the problem here is that in **365C** he seems to attribute to Theophrastus an explanation of the octopus' change of colour in terms of an involuntary fear-reaction. The change is clearly described as a reaction due to fear, not as a deliberate stratagem, and the octopus is described as cowardly as the chameleon was in **365D**. (It is, admittedly, only for the cowardice that Theophrastus is explicitly cited in **365C**, and not for the explanation of the change in colour, but Plutarch's expression strongly suggests that he is the source for both points and for the connection between them.) On the other

²⁸⁷ Wimmer included only lines 1-6 of **365D** as his fr. 189. Our including more is intended to facilitate discussion, *not* as an indication that lines 6-9 are necessarily to be taken as Theophrastean; cf. pp. 8-9 of the Introduction to vol. 1 of our texts and translations. See now Sorabji (1993) 55.

²⁸⁸ It might also be thought that if (Ia) is interpreted in terms of a type (1) reaction it would fit ill with what is said at **365A** 5-6 about the creature changing colour to match its surroundings, which sounds much more like a deliberate reaction of type (2) or (3). However, the combination of a type (1) reaction due to fear with a change to match specific surroundings may not be as difficult as it first appears; see below.

²⁸⁹ During (1966) 508; Fortenbaugh (1971) 165 n. 49. See above, n. 282.

hand, the context of **365C** shows that the contrast Plutarch is there concerned to draw is between the explanation through “breath” of the fact that the colour changes at all, and the influence of the environment in determining what the colour changes *to*; which suggests that the contrast between a change due to a physiological reaction of fear and a deliberate change to match the background is not as sharp as one might at first think (above, n. 288).

In **365B**, while Theophrastus is again said to attribute the octopus’ change of colour to fear, this is coupled with its desire for self-protection. Moreover, while **365C** mentions breath in connection with the octopus’ change of colour, neither **365B** nor **365D** does so. The evidence of **365B** suggests that Theophrastus talked not only of an automatic physiological response but also of deliberate behaviour of a defensive sort at least.

It may be that the contrast between automatic reaction and defensive behaviour is an unreal one where lower animals are concerned; the octopus’ reaction may be something that happens to it of necessity but *also* serves a purpose.²⁹⁰ Aristotle in *PA* 4.5 679a13 says that the change *happens to* (*sumbainei*) the octopus through fear,²⁹¹ but also describes it as useful for defence and compares it to the emission of ink which he has said (679a7) cuttlefish “produce” (*poiountai*, middle voice). Theophrastus too may not have drawn a strong contrast; we should perhaps be wary of reading back Plutarch’s distinction in **365D**, between what a creature does and what happens to it, into our interpretation of Aristotle and Theophrastus. It is only Plutarch in **365D** who introduces the notion that a change of colour due to fear is therefore a change “*to no purpose*”. Since Aristotle allows that the processes of inanimate nature are directed towards ends, he and Theophrastus can certainly allow that the automatic but natural reactions of living creatures serve a purpose;²⁹² in the case of human beings a distinction between such reactions and deliberate action is available, but it is not clear that this must extend as far down the

²⁹⁰ Philo Judaeus, *On the Drunkenness of Noah* 172, says that nature gave the chameleon and octopus their changes of colour for protection.

²⁹¹ Cf. Fortenbaugh (1971) 156. Peck (*Aristotle: Parts of Animals*, etc., *LCL* 1937, 321) translates “it can change its colour, and *it does so*” (my italics). On the face of it Peck’s rendering blurs the contrast between deliberate action and what happens to the creature passively; but the contrast may be an unreal one, and the implications of passivity in Aristotle’s “this happens to it” should not perhaps be stressed.

²⁹² This would not indeed be so for Theophrastus if ch. 9 of his *Metaphysics* were taken as denying all purpose in nature. But on this cf. Most (1988).

scala naturae as the octopus. Furthermore, as Bill Fortenbaugh points out to me, the automatic but natural reaction of the octopus may count as *voluntary* in terms of Aristotle's definition in *Nicomachean Ethics* 3.1, provided that it is seen—as it surely can be—as the creature's own response to an external stimulus, rather than as a result of external compulsion. (On the whole question of the internal or external origin of animal behaviour see Furley [1978]).

The claim that the octopus changes colour in order to *hunt* appears not only in **365D** 6-9 but also (along with the explanation as due to fear) in *HA* 9.37 622a8-10.²⁹³ If that text is in any sense Theophrastean then we would have reason to connect with Theophrastus a rather more definitely active change on the part of the octopus.

365A Photius, *Library* 278 525a30-b21 (*CB* vol. 8 p. 157.18-158.21 Henry) 5-8 The chameleon changes to all colours] On the chameleon see above on **365A-D**, and Keller (1910-13) 2.281-4.

9-21 The *tarandos* is about the size of an ox] The *tarandos* has been identified with the reindeer (whose modern name is *Rangifer tarandus*) or with the elk (*Alces alces*, American moose). Conceivably the basis of the story is a confusion with seasonal changes of colour.²⁹⁴ Seasonal changes (which Theophrastus discusses at *HP* 2.4.4; see below on **383**) are after all a way of matching the background, as with the octopus and chameleon, even if “they take on diverse colours to match many different surroundings” suggest more rapid changes than occur in the hairy coat of any animal. Theophrastus' comment that the story as presented here is “truly contrary to expectation and incredible”, noted by Battezzato, is appropriate. (See above, n. 122.) *Mirabilia* 30 refers to the *tarandos* as being difficult to catch because the

²⁹³ Joachim (1892) 36 accordingly suggests that Theophrastus mentioned the hunting motive in *On the Intelligence and Habits of Living Creatures*, which he regards as the source of *HA* 9, but not in *On Creatures that Change Colour*, where it would be less relevant. One might ask, though, whether Theophrastus would there have wanted, by omitting the hunting motive, to give the impression that the change was *only* due to fear. Antigonos 50 is based on the *HA* 9.37 passage. A similar report also in Aelian 7.11.

²⁹⁴ So Keller (1909-13) 1.280, saying that wild reindeer are brown in summer but grey in winter. Some other creatures such as the Arctic fox (*Alopex lagopus*) change colour even more dramatically.—Schneider (1818) vol. 4 812, identifying the creature as the elk, notes that the skin and hair on the horns in 12-13 would apply only to the horns when newly grown, the covering subsequently being rubbed off.

colour of its hair changes to match the place it is in; that text too emphasises the oddity of a change of colour in hair rather than skin, and describes the creature as exceedingly rare.²⁹⁵

With **365A** 3-4 and 9-21 cf. also Erasmus, *Parabolae* (vol. 1.5 p. 284.20-1 and p. 331.115-6, ed. 1975), and with 13-14 also *ibid.* 264.716. Erasmus cites “Aristotle, Pliny and Theophrastus” as the sources for this whole section of his work (vol. 1.5 p. 230.122); cf. above, n. 1.

22 The chameleon seems to effect its changes in colour by means of its breath] Pliny 8.122, copied by Erasmus *Parabolae* vol. 1.5 pp. 264.721, 284.14-15, says that the chameleon feeds entirely on the air, gaping with its mouth in a manner that is almost terrifying;²⁹⁶ this detail is not found in *HA* 2.11 (see above). H. Rackham ad loc. (*Pliny, Natural History* vol. 3, *LCL* 1940, 2nd ed.²1983, p. 86 n.(b)) explains that the tongue shoots out to catch insects so quickly that the chameleon’s feeding on them was not noticed.

23 A sign of this is the size of its lungs] strictly, “lung”, *pneumonos*. So Bekker and Wimmer; Henry in the Budé edition has *pneumatos*, “breath”, without comment. Schneider (vol. 4 p. 812) reports that *pneumatos* occurred, in the contracted form πῦς, in “Stephanus’ second exemplar”, though Stephanus himself kept *pneumonos*. Heinsius however preferred *pneumatos*. **365D** speaks of the creature’s “lung”, but also of “the great amount of breath”, and so is unfortunately not decisive as to the correct reading in **365A**.

365B Athenaeus, *The Sophists at Dinner* 7 104 317F (*BT* vol. 2 p. 199.9-19 Kaibel)

3-4 In *On Creatures that Live on Dry Land*] See above, on **363** no. 2.

²⁹⁵ The *Mirabilia* replaces the reference to the Scythians or the Sarmatians by one to “the Scythians called Geloni”; Huby (1986) 324 n. 19 suggests that this is simply a mistake. Herodotus (4.20-21) places the Sarmatians on the Sea of Azov east of the Don, with the Royal Scythians further west and the Budini (see above on **355A.4**) further north; the Geloni were in the same region as the Budini (4.108-9). Cf. How and Wells (1912) vol. 1 pp. 310, 340-1. The Geloni are then too far south for reindeer; but Herodotus also refers (4.22.3) to other Scythians beyond the Budini, and the geographical reference of “Scythians” and “Sarmatians” may be vague, the more distant regions being included under the names of the more familiar peoples.

²⁹⁶ Erasmus makes explicit, as Pliny does not, his belief that the creature gapes in this way *because* it feeds on air.

5-7 In *On Differences with regard to locality*] see above, on **350** no. 4 and on **363** no. 2; Joachim (1892) 24; D'A.W. Thompson (1947) 207; Sharples (1992,2) 375.

365C Plutarch, *Natural Explanations* 19 916B (*BT* vol. 5.3 p. 15.14-19 Hubert-Pohlenz-Drexler)

365D Plutarch, *On the Intelligence of Animals* 27 978E-F (*BT* vol. 6.1 p. 58.17-59.2 Hubert-Drexler)

See above. With **365D** 1-2 cf. also Erasmus, *Parabolae* (vol. 1.5 p. 254.538, ed. 1975), and with 4 *ibid.* p. 300.277, from Pliny. Margolin 255 n. derives the former passage from *HA* 2.11, but there is no reference there, as there is in Erasmus, in *PA* 4.11 and in our present passage, to the chameleon's *fear*.

CREATURES THAT HIDE²⁹⁷

366-70 Rose (1863) 280, 366-71. Joachim (1892) 15-16. Regenbogen (1940) 1429. Flashar (1972) 40, 98-100. Huby (1986) 318-19. Sharples (1988) 42-3.

See above, **350** no 10; and in addition to **366-370** see also on **362A** 2-3.

Creatures that hide are also mentioned by Theophrastus in *On Fish* §§7 and 9. The hiding of various types of creature in winter (hibernation) or in summer (aestivation) is discussed at length at *HA* 8.13-17. Huby (1986) 318-19 argues that the *HA* account is a compilation, being incomplete and with disproportionate coverage of certain topics, and that the absence from *HA* 8 of certain topics dealt with in Theophrastus (snails, **366**, and the electric ray, **369**) suggests that the compiler of *HA* 8 drew on the Theophrastean work rather than vice versa. See also below on **368**.

Mirabilia 63-7 are also connected with the topic.²⁹⁸ Flashar indeed suggests that *Mirabilia* 63a (hibernating birds in Pontus insensible till

²⁹⁷ "Hibernate" is an inexact translation, since for Theophrastus like Aristotle *phôleia* includes "hiding" in summer (aestivation) as well as in winter; cf. Balme (1991) 147 n.(c).

²⁹⁸ So Rose (1863) 280; Joachim (1892) 15.

roasted), 63b (fish insensible till heated) and 65 (hedgehogs can go without food for a year) come from *On Creatures that Hibernate*,²⁹⁹ but that 64 (bees go to work at the winter solstice and cicadas sing after it) comes from *On the Intelligence and Habits of Living Creatures* (= **350** no. 11), 66 (the gecko eats its shed skin because it is useful for epileptics) from *On Creatures said to be Grudging* (= **350** no. 7), and 67 (the fat of she-bears at the time of hibernation; see below on **370**) from *On Odours* (= **384** no. 2g).³⁰⁰ But it is possible, as Flashar recognises, that the fat of bears was discussed in *On Creatures that Hibernate* as well as in *On Odours*, especially since it is clear that Theophrastus *somewhere* said more on this topic than is found in *On Odours* (see below on **370**). As for the gecko in *Mirabilia* 66, *HA* 8.17 600b23 speaks of the gecko's and other reptiles' shedding their skin in a context concerned with hibernation, and Theophrastus may well have done the same; cf. **367**.³⁰¹ Flashar warns of the dangers of assuming that a sequence of apparently related items in the *Mirabilia* all come from the same source;³⁰² but there are other cases in which it can be shown that the same observation appeared in more than one of Theophrastus' works. See above, n. 118.

HA 8 connects hibernation and aestivation with a desire to avoid excesses of cold and warmth (8.13 598a1, 599a8) though saying that the reason for bears' hibernating is disputed (8.17 600a30). Theophrastus is reported as attributing the hibernation of the electric ray to the cold in **369**, and no doubt used this explanation elsewhere too.

366 Athenaeus, *The Sophists at Dinner* 2.63 63C (*CB* vol. 1 p. 155.16-20 Desrousseaux)

Rose (1863) 366-7.

The emergence of snails from hibernation is used to explain their appearance in large numbers. Compare the theme of **359** above.

²⁹⁹ Even though 63b also has a parallel in *On Fish* §8, where it is made clear, as it is not in the *Mirabilia*, that the fish in question are frozen. But for Theophrastus repeating the same observation in more than one work see below.

³⁰⁰ Flashar (1972) 98-100 (cf.40).

³⁰¹ So Joachim (1892) 16.

³⁰² Flashar (1972) 40.

- 367** Athenaeus, *The Sophists at Dinner* 3.65 105D (BT vol. 1 p. 241.12-14 Kaibel)

D'A.W. Thompson (1947) 18, 102-4.

Astakos is the lobster, *Homarus gammarus* L.; *karabos* the cray-(craw-) fish, langouste or spiny lobster, *Palinurus vulgaris* L. (more common in the Mediterranean than the lobster); *karis* a general term for other, smaller crustacea. HA 8.17 601a16, immediately after mentioning the shedding of the skin, notes that the crayfish hibernates for five months.

- 368** Athenaeus, *The Sophists at Dinner* 7.63 301EF (BT vol. 2 p. 164.22-5 Kaibel)

Regenbogen (1940) 1429. D'A.W. Thompson (1947) 88. Balme (1991) 153.

The words "and as long as . . . because of the *oistros*" are virtually identical to HA 8.15 599b24-6. Regenbogen argues that material from Theophrastus has here been incorporated into the HA, but Balme that Athenaeus' source here was not in fact a work by Theophrastus but an epitome of Peripatetic biology. The parasite that infects the tunny is mentioned at HA 5.31 557a27; 8.13 598a18; 8.19 602a28.

- 369** Athenaeus, *The Sophists at Dinner* 7.95 314B-C (BT vol. 2 p. 191.18-24 Kaibel)

Rose (1863) 347. Joachim (1892) 35-6. Kroll (1942) 11. D'A.W. Thompson (1947) 169-70. Gottschalk (1965) 156. F.J. Kovach, 'The enduring question of action at a distance in Saint Albert the Great', in id. and Robert W. Shahan (eds.) *Albert the Great: Commemorative Essays*, Norman: University of Oklahoma Press, 1980, 161-235, at 167.

1-2 it is on account of the cold that the electric ray burrows under the earth] (i.e., under the sea-bed). The parallel from Pliny in the apparatus should not be 9.143, as in our first printing, but 9.57; the latter refers to hibernation, the former to the creature's lying in wait for its prey. Cf. Kroll 11.

2-6 And in *On (Creatures) that Bite and Sting*] See above on **360-1**. The numbing effect of the electric ray or torpedo fish, *Torpedo marmorata* Risso, is frequently referred to.³⁰³ More specifically, there are refer-

³⁰³ See for example Plato, *Meno* 80a; Galen, *On the causes of symptoms* 1.5, vol. 7 p. 109 Kühn; Galen, *On affected places* 2.2, vol. 8 p. 72 Kühn; Galen, *On the Composition*

ences to the effect being transmitted through fish-spears, as here,³⁰⁴ through rod and line,³⁰⁵ or through nets.³⁰⁶ Gottschalk attributes to Theophrastus the view that the shock of the ray is caused by cold, citing this passage; but this seems to be an unjustified extension to the second report of the reference to cold in the first.

370A Pliny, *Natural History* 8.128 (CB vol. 8 p. 67.23-68.3 Ernout)

Joachim (1892) 28-9. Röhr (1923) 58. Thorndike (1924) 82. Regenbogen (1940) 1424, 1429. Flashar (1972) 100. Fraser (1972) vol. 2 p. 643.

Pliny attributes three points to Theophrastus: (i) while bears are hibernating, boiled bears' flesh grows in size; (ii) hibernating bears have no food in their belly; (iii) they have very little blood. Of these points, (i) is mentioned by Theophrastus, *On Odours* 63 and by *Mirabilia* 67, but in both cases with reference to bears' fat rather than to boiled meat;³⁰⁷ and (ii) at *HA* 8.17 600b8-9. (iii) fits the general theme of suspended animation. (i) is also reported, from Pliny and naming Theophrastus, by Petrus Berchorius (see above on **359B**), comparing the bear to Christ and the flesh to the faithful who increased in number while Christ was in the tomb after the Crucifixion, and by Erasmus, *Colloquia* vol. 1.3 p. 52.638-9 = p. 96.633-5 = p. 204.2565-7 (ed. Amsterdam 1972).

and *Powers of Simple Drugs* 11.48, vol. 12 p. 365 Kühn; Sextus Empiricus, *Outlines of Pyrrhonism* 1.93; Albert the Great, *On Animals* 8.3 (vol. 1 p. 619.29-620.4 Stadler).

³⁰⁴ Pliny 32.7; Galen, *On the usefulness of respiration* 4, 4.497.9-13 Kühn; Galen, *On affected places* 6.5, 8.421.16-422.2 Kühn.

³⁰⁵ Oppian, *Fishing* 3.149; Pliny loc. cit.; Plotinus 4.5, 1.29; Olympiodorus, *On Aristotle's Meteorology* 33.7-11; Philoponus, *On Aristotle's Meteorology* 48.7-49.1; Erasmus, *Parabolae* vol. 1.5 p. 250.471-2, from Pliny (Margolin [1975] 251 n.).

³⁰⁶ Aelian 9.14; Plutarch, *On the Intelligence of Animals* 978bc; Alexander, *On Aristotle's Meteorology* 18.21-4; Themistius, *On Aristotle's On the Heaven* 110.23-5; Simplicius, *On Aristotle's On the Heaven* 440.23-8; Averroes, *On Aristotle's On the Heaven* 2.42 (vol. 5 125d of the Juntine ed.); Priscian, *Answers to Chosroes* 97.1-3 (see above on **360**), referring to wood and "ropes".

³⁰⁷ Other examples of such seasonal sympathies in *On Odours* 62-3 include goatskins affected in the breeding season and other examples of stored plants. Fraser (1972) vol. 2 p. 643 compares also *CP* 1.7.4 (twigs of pennyroyal [*bléchros*, *Mentha pulegium* L.] flower at the winter solstice even when removed from the plant), and distinguishes these examples from the "sympathy" involved in the chameleon's changing colour to match its surroundings (**365A**). Both types of sympathy are to be distinguished from the *affinity* between bees and oak trees in **435** and that between men and animals in **531**.—I am grateful to Peter Kingsley for discussion of this text.

Pliny goes on to refer in 8.129 to bears at the end of their hibernation eating *arum* (cuckoo-pint, *Arum maculatum* L.; cf. André [1985] 26) to loosen their bowels; this appears also at *HA* 8.17 600b11 and 9.6 611b34, and is linked by Joachim with Theophrastus' *On Creatures that Hide*.

370B Scholion on Theocritus' *Idyll* 1.115 (a, p. 67.8-10 Wendel)

Gossen, art. 'Sostratos'(13), *RE* 3A.1 (1927) 1203-4.

The scholium cites Theophrastus and Sostratus for the general fact of bears' hibernation. Gossen suggests that *On Bears* was a part of Sostratus' *On Living Creatures*. For Sostratus cf. above on **355A** 5-7 and **360**.

[Additional text = **370C**] (Spurious report concerning Theophrastus) Bartholomew Anglicus, *On the properties of things* 18.110, *On the Bear* (p. 1126.34-1127.8 ed. Frankfurt, 1601)

Bartholomew (who compiled his work between 1248 and 1267),³⁰⁸ first gives material which he explicitly (p. 1126.8-9) attributes to Pliny, and which includes a reworded and slightly expanded paraphrase of **370A** (p. 1125.25-30). He then proceeds (1126.10ff.) to give material explicitly cited as from Aristotle <*HA*> 6. This however is followed by a bizarre account of a method of hunting bears by hanging a hammer in front of the hole in a tree from which they get honey, so that the bear, repeatedly pushing the hammer aside and being struck by it, batters itself to death (1126.34ff.). Bartholomew then comments that "This method of hunting bears is recorded by Theophrastus, and he learned this same method from bear-hunters in the regions of Germany" (1127.6-8)—which seems highly improbable, to say the least. The reference is inexplicable.³⁰⁹

OTHER ITEMS ABOUT LIVING CREATURES

371 Athenaeus, *The Sophists at Dinner* 9.37 387B (*BT* vol. 1 p. 343.24-9 Kaibel)

³⁰⁸ Cf. R. Steele and W. Morris, *Medieval Lore from Bartholomew Anglicus*, London: Chatto and Windus, 1924, 6-7.

³⁰⁹ I am grateful to Pamela Huby for drawing my attention to this text.

Schweighäuser (1801-7) vol. 5 p. 128. Rose (1863) 371. Joachim (1892) 6. Regenbogen (1940) 1425, 1429. Kroll (1942) 5.

It is clear that "Such a distinction applies to birds, too" in **371** reflects something in the original Theophrastean context rather than in the context in Athenaeus. The distinction could be one between creatures that are fully developed when hatched and those that are not.³¹⁰ For the reference to book 3 of *On Living Creatures* see above on **350** no. 1.

For the francolin (*Tetrao francolinus* L.) see D'A.W. Thompson (1936) 60-1; for the partridge (various species), *ibid.* 234-8; for the cock (*Gallus gallinaceus* L.), *ibid.* 33-44; and for the pheasant (*Phasianus colchicus* L.), *ibid.* 298-300.

In support of *bradea* ("for some of them are slow", rather than "for some of them are heavy," *barea*), Renehan in a private communication cites Bussemaker's reading *braduterois* for the MSS *brachuterois* at [Aristotle] *On Breath* 8 485a17-18. But Bussemaker also suggested *baruterois* as an alternative emendation there, and it is preferred by Roselli ([1992] 120); the heaviness of birds that are not good fliers is repeatedly mentioned by Aristotle (*HA* 2.12 504b9, 9.8 613b6; *Parts of Animals* 2.13 657b8, 4.12 694a6; *Generation of Animals* 3.1 749b19ff.) as Schweighäuser and Roselli note.

372 (Dubious report concerning Theophrastus) Jerome, *On Jeremiah* 3.57.2 (CCSL vol. 74 p. 167.9-15 Reiter)

F. Sbordone, *Physiologus Graecus*, Milan etc.: Albrighi, Segati & c., 1936, 68-9. F.J. Carmody, *Physiologus Latinus versio B*, Paris: Droz, 1939. *Id.*, *Physiologus Latinus*, *University of California Classical Publications* 12 (1941). Courcelle (1969) 88-9 n. 213.

Jerome's commentary on *Jeremiah* was the last of his commentaries, begun in 414-15 and left incomplete at his death in 420. See J.N.D. Kelly, *Jerome: his life, writings and controversies*, London: Duckworth, 1975, 316.

The belief that the partridge stole and hatched the eggs of other partridges was widespread in late ancient and medieval writers, as the apparatus shows; Sbordone traces the tradition in general to

³¹⁰ The reference to birds that cannot fly is hardly to be connected with the topic of fish out of their natural habitat (see above on **350** no. 8).

Ambrose, and Courcelle argued that this passage of Jerome in particular derives from him. Jerome is commenting on *Jeremiah* 17.11, "Like a partridge which gathers into its nest eggs which it has not laid, so is the man who amasses wealth unjustly" (trans. *New English Bible*). But no source other than Jerome mentions Theophrastus in this connection. Engelbrecht (cited by Reiter in *CCSL*) supposed that the reference to Aristotle, Theophrastus and Pliny in our text of Jerome is a misguided gloss; Reiter, editing this text in *CCSL*, that Jerome may have been thinking of the cuckoo, referred to as depositing its eggs in the nest of the warbler at *CP* 2.17.9 (see above on **350** no. 11). If this text does preserve genuine information about Theophrastus, a connection with **350** no. 11 is perhaps most likely.

- 373** Athenaeus, *The Sophists at Dinner* 14.69 654D (*BT* vol. 3 p. 448.6-9 Kaibel)

D'A.W. Thompson (1936) 177.

For the *Memoranda*, and for uncertainty over their attribution to Aristotle or Theophrastus, see **727** no. 6. The larger size of males than females, generally, is remarked in [Aristotle] *Problems* 10.8; in *HA* 4.11 538a22ff. Aristotle remarks that among *land* animals (*peza*) the males are bigger in the case of animals that produce live young, the females bigger among those that lay eggs; nothing is said here specifically about birds, and the present remark may have originated in the context of an attempt to extend the discussion.

- 374** Scholium on the *Argonautica* of Apollonius of Rhodes 1.972 (p. 85.11-15 Wendel)

Wehrli (1967-78) vol. 9, pp. 9 and 28.

Theophrastus' *Letter to Phantias*, his fellow-Eresian and fellow-Peripatetic, is also recorded by Diogenes Laertius 5.37 = **1**. Diogenes' catalogue of Theophrastus' works includes "Letters to Astycreon, Phantias, Nicanor" (5.50 = **727** no. 16). At *HP* 4.3.6 Theophrastus reports that according to the Libyans desert animals eat the woodlouse (*onos*), "which also occurs among us, with many legs (*polupous*, as here) and black, rolling itself into a ball (*suspeirōmenon eis heauto*). Amigues (1989) 217 notes that *onos* in this sense is regularly accompanied by the adjective *polupous* (e.g. *HA* 5.31 557a23), and that one species is still named *Oniscus asellus*, "ass-louse". Wehrli argues that,

as Aristotle applies *polupous* to *onos* (*HA*, loc. cit.) and to “the *genos* of *iouloi*” (*PA* 4.6 682b2), he regards *onoi* as one species of *iouloi*; but the inference is not compelling.

- 375** (Dubious report concerning Theophrastus) Manuel Philes, *On the Properties of Animals* 85.1521-2 and 1532-5 (p. 37.8-9 and 19-22 Dübner)

D'A.W. Thompson (1947) 74, 114, 132-3, 150-1, 194, 219, 280-1. On this poem by Philes see generally Hunger (1978) 266-7.

Philes' description seems to be based on Aelian 9.49, which lists, as large sea-beasts (*kêtê*) not found near the shore, *leôn*, *zugaina*, *pardalis*, *phusalos*, *prêstis*, and *malthê*, all but the last (unidentified; D'A.W. Thompson [1947] 158-9) occurring here too. Aelian then goes on to describe the *krios* as dangerous because of the wave and upheaval it creates in the sea. Oppian, *Halieutica* 1.367ff., lists among large sea-beasts *leôn*, *zugaina*, *pardalis*, *phusalos*, tunny, *prêstis*, *lamna* (a shark, D'A.W. Thompson [1947] 144), *malthê*, *krios*, “hyena” (unknown, D'A.W. Thompson [1947] 272) and *kuôn* (smaller sharks or dogfish, D'A.W. Thompson [1947] 136). Oppian is probably Aelian's source;³¹¹ but why Philes linked the material with Theophrastus is unclear. See also above, on **350** no. 8.

kêtos is a general term for large sea-creatures, often sea-monsters.³¹² *prêstis* is identified with the sawfish, *Pristis antiquorum* L., Spanish *prista*, on the basis of etymology (*priein* = to saw), but the identification is uncertain.³¹³ *krios* is unknown (described at Aelian 15.2 and Pliny 9.145 = *aries*); it may be a large dolphin or killer whale.³¹⁴ *zugaina* is the hammer-headed shark, *Zygaena malleus* (*Squalus zyganena* L.).³¹⁵ *pardalis* (“leopard”) and *leôn* (lion) are unknown; Aelian 16.18 speaks of sea-monsters near Ceylon with the heads of lions, leopards, wolves and rams.³¹⁶ *phusalos* is a large whale (more often *phusêtêr*, but *phusalos* in Aelian 9.49, above).³¹⁷

- [Additional text:] (Spurious report concerning Theophrastus) Erasmus, *De copia* (*Foundations of the abundant style*) 66 (p. 132.625-6 ed. B.T. Knott, *Erasmus*:

³¹¹ Wellmann (1895) 165; Keydell (1937) 413-14; Scholfield, (1958-9) vol. 1 p.xxii.

³¹² D'A.W. Thompson (1947) 114.

³¹³ D'A.W. Thompson (1947) 219.

³¹⁴ D'A.W. Thompson (1947) 132-3.

³¹⁵ D'A.W. Thompson (1947) 74.

³¹⁶ Cf. D'A.W. Thompson (1947) 150-1, 194. There is no necessary connection with the creature now called “sea-lion”.

³¹⁷ D'A.W. Thompson (1947) 280-1.

Opera omnia, eds. J. Waszink etc., vol. 1.6, Amsterdam: North Holland Publishing Co., 1988)

B.T. Knott, Erasmus, *De copia*, in *Collected Works of Erasmus*, ed. C.R. Thompson, Toronto: University of Toronto Press, 1978, vol. 24 p. 438.16.

Erasmus cites Theophrastus as saying that "an animal which does not have warm blood does not breathe". This is the *only* reference to Theophrastus in Erasmus which cannot be traced to some other surviving source. The closest parallel in Aristotle is *PA* 3.6 668b35ff.: blooded creatures, being warmer, need external cooling by water (though gills) or air (through lungs), while bloodless creatures can cool themselves by means of the connate *pneuma*. Aristotle links the need to breathe with warmth at *On Respiration* 13 477a11-25; at 1 470b13ff. he says that animals with less blood in their lungs need to breathe less,³¹⁸ and at 9 474b25-9 he indicates that small and bloodless animals do not need to breathe. 9 475b5 suggests that sea creatures without blood do not take in water, while fish which have blood do.³¹⁹ On the other hand, Theophrastus at *On Sensation* 47 says "of living creatures some have no blood and others do not breathe at all", which would seem to suggest that there are some without blood which *do* breathe. Theophrastus links respiration with the need for cooling in *On Creatures that Remain on Dry Land* (see above on **363-4**), but does not there explicitly mention possession or lack of *blood*. It seems highly probable that Erasmus has concocted his own example and attributed it to Theophrastus, perhaps influenced by a misremembering of the contents of *On Creatures that Remain on Dry Land*. The context in Erasmus' treatise is concerned with different formulae for citing authorities, not with biological doctrine, and for the unreliability of attributions to sources in this work cf. Knott (1988) 19; though it must be admitted that all the other citations in this chapter are either accurate (references to Epicurus and Aristotle preceding that to Theophrastus, and one to Pliny the Elder following it) or so empty of specific content that the question of accuracy does not arise.³²⁰

³¹⁸ Cf. also 15 478a11-26.

³¹⁹ Cf. also Theophrastus *On Fish* 6 with Sharples (1992,2) 353, and below on **430-4**. Aristotle, *On the Soul* 2.9 421b20 apparently identifies bloodless creatures with those that do not respire; cf. W.D. Ross, *Aristotle: De Anima*, Oxford: Clarendon Press, 1961, 255 ad loc.

³²⁰ The breathing of some animals but not others occurs as an example in **103B**,

REPRODUCTION

376-83 Reports of Theophrastus' views on the reproduction both of human beings and of animals have been grouped together in this section; for the evidence collected here suggests that Theophrastus followed Aristotle's general views, and that for him as for Aristotle the same principles applied to the sexual reproduction of human beings and of other living creatures. The former claim may in fact need to be modified where spontaneous reproduction is concerned (see below on **383**), and though there is no reason to doubt the truth of the latter, the value as evidence for it of the passages collected here as evidence is dubious. The reports in fact fall into three groups. First there are a number of passages in which Albert the Great reports Theophrastus as sharing the general views of Aristotle on sexual reproduction (**376-378**. On **379** see further below); next a number of passages from various sources reporting isolated observations on particular points (**380-382**); and finally a general report on spontaneous generation linking Aristotle and Theophrastus together (**383**).

The first group of passages, from Albert, might at one extreme be taken to be little more than instances of the tendency to couple Theophrastus' name to reports of Aristotle's views that we see elsewhere too.³²¹ Albert himself comments on the closeness of Theophrastus' views, as he has described them, to those of Aristotle (**377** 36-8). Much clearly depends on the nature of Albert's sources. The fact that he repeatedly (**376A**, **376C**, **379**) couples Theophrastus and Porphyry as Peripatetics may provide a clue here. There are other places where Theophrastus and Porphyry are linked in Albert³²² and in Arabic sources.³²³ For Albert reporting Theophrastus' views on generation—again in company with Aristotle—cf. also **270**. If genuine Theophrastean material does underlie these reports, there is a

but there is probably no connection.—I am grateful to Pamela Huby, Vivian Nutton and Richard Sorabji for discussion of the issues raised by this text and for drawing my attention to some of the references.

³²¹ For example, in Galen (see above, on **331**). Cf. also, for example, **162**.

³²² Cf. **151C** (in a context that suggests transmission through Arabic); and compare Albert's report of Theophrastus in **354** above to Porphyry's in **531**.

³²³ Cf. **145**, where both Theophrastus and Porphyry are listed by aš-Šahrastāni as among Themistius' sources. Altheim and Stiehl have argued that Porphyry's *History of Philosophy* was utilised as a source for Greek philosophy by aš-Šahrastāni; but it finished with Plato, and aš-Šahrastāni's references to Theophrastus, seem to come from other sources. Cf. Altheim-Stiehl (1961) 14-15, to be read in the light of the fuller analysis in Gutas (1985); cf. also Daiber (1985) 104.

problem over what Theophrastean work it derives from; see above on **350**, ad fin., and below on **380**.

376A-C (Dubious reports of Theophrastus) Albert the Great, *On Animals* 3.2.8 (p. 346.4-11 Stadler); 9.2.3 (p. 714.29-36 Stadler); 15.2.10 (p. 1051.19-30 Stadler)

Nardi (1960) 38. Demaitre and Travill (1980) 414-421. Weisheipl (1980,2).

It is impossible to assess Albert's references to Theophrastus except in the context of Albert's own theory of reproduction. This can be interpreted in the context of three influences—Aristotle, Galen and Avicenna. For Aristotle the male seed provides the formative principle for the embryo, the female menstrual blood the matter; his rejection of the theory that both male and female alike contribute seed being bound up with his rejection of the view that they contribute seed derived from every part of their bodies (the "pangenesis" theory).³²⁴ However, menstrual blood for Aristotle is *analogous* to male seed, but not fully concocted because of the lower temperature of the female. It can therefore be described as seed in a sense;³²⁵ and Aristotle's theory of heredity concedes a formative role to the female contribution as well, though interpreting this as failure by the male contribution to dominate and impose its form on the matter from the female. For Galen both male and female contribute seed, but the female's seed is less perfected, and she contributes matter in the form of menstrual blood as well.³²⁶ While both mother and father contribute seed which determines the features of the offspring, the

³²⁴ *GA* 1.18; cf. **376C** here.

³²⁵ Cf. *GA* 1.20 728a26; A. Preus, 'Science and Philosophy in Aristotle's *Generation of Animals*', *Journal of the History of Biology* 3 (1970) 1-52, at 8-9; Balme (1991) 28-9; D. McG. Tress, 'Aristotle's Metaphysical Science', *Review of Metaphysics* 46 (1992-3) 307-341, especially 314 n. 14, 320 n. 25 and 323-5.

³²⁶ Galen, *On Seed* 2.2, 2.4; de Lacy (1992) 50. In 1.3 Galen attacks those who interpret Aristotle either as saying that the male seed is ejected by the female after conception or as saying that it contributes materially to the embryo; for Aristotle the male seed simply evaporates (*GA* 2.3 737a12ff.; for Galen's discussion cf. Accattino [1988] 87-8). But Galen himself holds that it does contribute materially (*De Lacy* [1992] 48). At *On Seed* 2.1 606 Galen, using the example of the sculptor Polycleitus, attacks those who say that the mother influences the features of the child, such as the colour of eyes (for which cf. Aristotle, *GA* 5.1 778a33) through the matter rather than through seed; cf. Accattino (1988) 90-3.

matter too is involved in determining its species and also its sex, and so the mother has a larger part to play here.³²⁷

Avicenna, in the context of the Aristotelian theory, attacks the identification of menstrual blood as the material principle of the embryo; on the contrary, he argues, menstrual blood is the sign of failure to conceive.³²⁸ The female contribution is a secretion at the time of intercourse and conception, which may or may not be visible externally. Aristotle had discussed such a secretion, but argued that it does not contribute as seed;³²⁹ and so too had Theophrastus, if it is this that is referred to at *Metaph.* 9 10b9.³³⁰ The existence of egg cells was not suspected until the seventeenth century.³³¹ Albert himself argues that the female seed contributes matter for the embryo, the retained menstrual blood nourishment as it grows.³³²

There are however further complications affecting Albert's account. In 376A Albert, reporting the view of "Theophrastus and Porphyry" states that for them the male seed contains a "formative" or "forming" power (*virtus formativa sive formans*) and the matter from the female an "informative power" (*virtus informativa*).³³³ This term is naturally interpreted in an active sense.³³⁴ Nardi observes that Albert elsewhere regards Galen as attributing an active power to the female, in a different sense from the male, and expresses this by the

³²⁷ Galen, *On Seed* 2.2 p. 615 Kühn, cf. 2.5 p. 642 Kühn. I am grateful to Vivian Nutton for references in this and the preceding note.

³²⁸ Avicenna, cited in the apparatus to 376B.1-7 (= p. 396.12 in *Šifāʾ: Physics*, 8, eds. A. Montasir, S. Zayed, A. Ismaʿil, Cairo: Organisation générale Egyptienne pour l'édition et la publication, 1970) and 376C.4-12 (= ibid. p. 402.1-3), is reporting a Peripatetic theory which he himself rejects. (I am grateful to Yegane Shayegan for the references to the Arabic text and for clarification of this point.)

³²⁹ *GA* 1.20 727b34, 728a33, 2.4 739a21, b1, 16; Peck (1942) 101 n.(c).

³³⁰ So, against Lennox (1985) 156, Repici (1990) 209, arguing further that εἴπερ μὴ συμβάλλεται should be translated, not with Ross-Fobes "unless indeed this makes some contribution", but rather "since this does not make . . .". Most (1988) 226-7, 232, takes the reference to be, not to menstrual blood *per se*, but to its emission when the female does not conceive.

³³¹ Cf. on this L.W.B. Brockliss, 'The embryological révolution in the France of Louis XIV: the dominance of ideology', in G.R. Dunstan (ed.), *The Human Embryo: Aristotle and the Arabic and European Traditions*, Exeter: Exeter University Press, 1990, 158-86.

³³² Albert *On Animals* 15.2.11, drawing on Avicenna *On Animals* 14.3; Demaitre and Travill (1980) 418.

³³³ Stadler here cites—tentatively—Theophrastus, *Metaphysics* 4 7a6ff. (§14 Wimmer); but that simply distinguishes between form and matter as principles.

³³⁴ That the prefix *in-* does not here have a negative force is clearly shown by the parallel with *informabilis* in 376A line 4.

use of *informativa* rather than *formativa*, while medieval writers other than Albert treat the two terms as equivalent.³³⁵ Albert's "formative power" presumably renders *dunamis morphôtikê*,³³⁶ but it is not clear that Albert's distinction between *formativa* and *informativa* represents one made in these terms by Galen himself. In effect, Albert is—not surprisingly, perhaps—presenting Galen's position as more Aristotelian and less Hippocratic than it actually was.³³⁷ Elsewhere Albert himself explicitly rejects the female seed's having an *informativa* power if that is taken to imply activity in the same way as the male principle—even if it is the activity of a moved mover, passive as well as active³³⁸—but allows it in the sense of a power that prepares and enables the matter to receive the action of the male principle.³³⁹ In our own passage he goes on immediately to explain *virtus informativa* by "or putting it better the informable power" (*[virtus] informabilis*), a term which is clearly passive; and just before our passage, at p. 346.2, he has argued that the *incoatio* is in the female and is according to the *passive* power.

³³⁵ Nardi (1960) 38 n. 5, citing Albert *On Animals* 15.2.11 (p. 1055.26 Stadler) and 16.1.17 (p. 1111.38 Stadler). In the first passage Albert cites Galen for the view that women produce seed which has a *virtus informativa* and is necessary for generation (Stadler cites Galen *On Seed* 1.3 for this); nothing is said explicitly about the *virtus* being active, but the reference to seed itself may imply this. (Albert himself raises the problem why this seed is not seen in female creatures other than women, and suggests that it is simply not visible; he attributes to Aristotle the view that it is not necessary for generation but facilitates it when present, but this seems to be a mistake. See above, n. 329.) In the second passage Albert says that Galen applies *virtus informativa* to the *habilitans et effectivum principium* recognised, he says, by Aristotle in the female which is capable of producing nutritive but not perceptive soul, as in wind-eggs. (In fact Aristotle only says that wind-eggs possess nutritive soul *potentially*, *GA* 2.5 741a24.) Stadler here cites Galen, *On the Use of the Parts* 14.11, and *On Seed* 2.1, but the *formativa/informativa* contrast does not seem to occur in either chapter.

³³⁶ Or perhaps *dunamis diplastikê*. The term *morphôtikê* occurs precisely once in Galen, at *On Seed* 2.5, vol. 4 p. 642.2 Kühn, where it is coupled with the rather more common *diplastikê* in the phrase *dunamis diplastikê kai morphôtikê*. For *dunamis diplastikê* cf. *On temperaments* vol. 1 pp. 635.17, 636.17 Kühn, *On the Natural Faculties* vol. 2 pp. 15.12, 86.7, 101.6 Kühn, and *On Seed* vol. 4 p. 611.14 Kühn. One might wonder whether *informativa* was an attempt to render *dia-plastikê*; but (i) *plastikê* and *diplastikê* never occur in the same Galenic work, and (ii) in *On Seed* 2.5 the *dunamis diplastikê kai morphôtikê* clearly relates to the seed of *both* parents. See further below.

³³⁷ Thus, even if the theory attributed to Theophrastus by Albert was actually his, it is not surprising that Galen does not refer to it. Vivian Nutton suggests to me that Albert's interpretation could have been encouraged by Galen's use of the analogy of the sculptor at *On Seed* 2.2 p. 606 Kühn; see above, n. 326.

³³⁸ Albert, *On Animals* 9.2.1 (p. 710.6 Stadler); Demaitre and Travill (1980) 419.

³³⁹ Ibid. 16.1.16 (p. 1110.30 Stadler). Demaitre and Travill (1980) loc. cit.

It may not be irrelevant that there is an apparent blurring of the distinction between form and matter, active and passive, in other doctrines of Albert's too. In more than one area of his thought there occurs a notion of potentiality as "inchoate form"; cf. **303**, where the idea is attributed to Theophrastus, together with the apparently related idea of a "formal potentiality" (*formalis potentia*),³⁴⁰ and the last sentence of **376A**.³⁴¹ Opinions vary as to how far Albert really compromises the indeterminacy of matter and how far his position is liable to his own pupil Thomas Aquinas' objections against doing so.³⁴² Perhaps what Albert understands by *virtus informativa* is something like the actuality or form that explains a potentiality; for Aristotle it is the second, or full actuality of doing geometry that explains the "first actuality" of the trained geometrician not engaging in geometry at the moment (cf. Aristotle, *On the Soul* 2.1 412a22ff.), but for Albert the first actuality, or second potentiality, has a principle of its own to explain it.

All this, however, still leaves the question; if the doctrine of *virtus informativa* as distinct from *virtus formativa* is not to be found in Galen, where did Albert get it from, if indeed it is not his own—perhaps unconscious—innovation? And does it have anything to do with Porphyry or Theophrastus, as our passage suggests? Galen's *On Seed* was

³⁴⁰ I am grateful to Pamela Huby for drawing these passages to my attention.

³⁴¹ Cf. Helen S. Lang, *Aristotle's Physics & its medieval varieties*, Albany: State University of New York Press, 1992. 134 ff. and 145 (on the theory of motion); I. Craemer-Ruegenberg, 'The priority of soul as form and its proximity to the First Mover' in Kovach and Shahan (1980) 49-62; also **303**, and the references in the next note. Nardi (1960) 69-101, sees the doctrine of potentiality as "inchoate form" as Neoplatonic and Augustinian in origin, and cites Albert as linking it with Porphyry's *Physics* commentary (Albert, *Summa Theologiae* pars II tract.1 quaest. 4, membr. 2 art. 4, solutio [vol. 32 p. 90a4 Borgnet]; Porphyry has also been cited, on the end of Aristotle *Physics* 1, at p. 88b. In this *articulus* Albert is arguing that the principles are two in number but three in *ratio*, the privation differing from matter only in adding a *ratio informatis formabilis*; Porphyry is cited for the view that the potentiality of matter is *potentia inchoationis formae*. I am grateful to Pamela Huby for this reference.) *inchoatio* is given as the equivalent of *aparchê* in G. Goetz and G. Gundermann, *Glossae Latinograecae et Graecolatinae* (*Glossaria Latina*, 2) Leipzig: Teubner, 1888, 233.33. The last clause of **376A** might perhaps be translated rather "can come to be as a power which is ordered and inchoate" (i.e. taking *potentia* as nominative rather than as ablative).

³⁴² That Albert's position was radically different from Thomas' was argued above all by Nardi (1960) 69-101; against this, J.A. Weisheipl, 'Conceptions of Matter in 14th-century science', in E. McMullin (ed.), *Conceptions of Matter in Ancient and Medieval Philosophy*, Notre Dame, Indiana: Notre Dame University Press, 1963, at 151-2, and Weisheipl (1980,2) 455-6.

available in Arabic translation, and it may be that Arabic terminology has influenced Albert. But Pamela Huby draws it to my attention that **308-9** attribute to Theophrastus discussion of the way in which material intellect is distinct from prime matter in that it is fitted to receive intelligible forms; this at least links to Theophrastus the idea of a prior determination (the "preparation") of **309**. Possibly there is some connection here with the ideas of the present passage.

If the contrast between *formativa* and *informativa* reflects anything in Greek sources—in Theophrastus, or even in Porphyry—the question arises what Greek original *informativa* could represent. *emmorphos* is, as it happens, used by Theophrastus himself in the sense of "possessed of form" (*Metaph.* 4 7a6), but no form in *emmorphôtik-* occurs in the index of *TLG* CD-ROM "D".³⁴³

In **376C** the ancient Peripatetics are said to support their theory by the fact that conception can occur even when nothing is emitted by the woman; since they have already been cited as saying that the woman emits no seed in the proper sense, this presumably refers to the absence sometimes of any discharge at all in coition.³⁴⁴ Albert continues by arguing in Peripatetic terms (against the Stoics, p. 1054) but without specific reference to Theophrastus.³⁴⁵

377 (Dubious report concerning Theophrastus) Albert the Great, *On Animals* 16.1.4 (p. 1075.1-37 Stadler)

For bibliography see above on **376**.

Albert cites Theophrastus *On Animals* for the doctrine that the power of all the parts of the soul is present in the seed; he describes this as an addition to the general Peripatetic doctrine, but in fact it seems little different from what Aristotle says in *GA* 2.3 736b8-29. Albert has been citing for the general theory Avicenna, Alexander, and "that philosopher whom the Arabs and Greeks call Theodorus".³⁴⁶ Weisheipl (1980,2) 457 n. 58 interprets the present passage as an objection by

³⁴³ See above, n. 336. *emplastikos* is common in Galen, but in the sense of "adhesive".

³⁴⁴ Cf. *GA* 1.20 728a34ff.; above, n. 329.

³⁴⁵ I am grateful to Pamela Huby, Vivian Nutton and Yegane Shayegan for discussion of these texts.

³⁴⁶ For Avicenna himself Stadler cites *On Animals* 15.2 fol.49r ed. a. 1500 (not 14.2—the page heading in the 1500 ed. of Avicenna is wrong). Nardi (1960) 20 argues that "Theodorus" here is in fact Themistius.

Albert against Theophrastus' "materialism", and indeed the materialism of *Alexander's* conception of seed has been emphasised in what has preceded.

Albert then (8ff.) speaks of the role of vital heat and breath in the fashioning of the embryo in the womb, while emphasising again that the contribution of the heat and breath in the mother is a passive one, providing material and an appropriate environment, and not an active one as "some doctors" had supposed. At line 8 this further section of the discussion is said to be the view of "all these" aforementioned, but at line 35 Albert refers again to Theophrastus, suggesting that he thought that the second part of his discussion too represented Theophrastus' views in particular. The claim that the mother's breath nourishes that of the embryo (25ff.) is noteworthy; Albert, like Aristotle (*GA* 2.6 741b37ff.) denies that the *pneuma* of the mother has a *formative* role for the embryo,³⁴⁷ but whereas Aristotle holds that the embryo is nourished by blood through the umbilical cord, Albert—aware that the umbilical cord contains both veins and arteries, while Aristotle had not clearly distinguished them³⁴⁸—here links breath with the arteries and blood with the veins, asserting that the embryo is nourished by both. This seems at first sight like the theory of Praxagoras and Erasistratus that the arteries contain breath and the veins blood (see above on **346**), but Albert in fact holds that the arteries contain a mixture of blood and breath, though more of the latter than the former (*On Animals* 1.2.20, vol. 1 p. 136.13-15 Stadler).

378 (Dubious report concerning Theophrastus) Albert the Great *On Animals* 20.1 (*Op. omn.* vol. 12 p. 1a9-13 Geyer)

B. Geyer, 'Die ursprüngliche Form der Schrift Alberts des Großen *De animalibus* nach dem Kölner Autograph', in A. Lang, J. Lechner, M. Schmaus (eds.), *Aus der Geisteswelt des Mittelalters, Studien und Texte Martin Grabmann . . . gewidmet (Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters, suppl. 3.1, Münster-i-W.: Aschendorff, 1935, at 578-90B. C. Hünemörder, 'Die Zoologie des Albertus Magnus', in Meyer and Zimmermann, 135-48, at 242-3. Geyer in *Albertus Magnus, Opera omnia* vol. 12 (1955) vii-viii, 1 n. 1.*

³⁴⁷ See above on **376**.

³⁴⁸ Cf. Demaitre and Travill [1980] 436.

Albert's treatise *On the Nature and Origin of the Soul* appears in his own autograph MS as the twentieth book of *On Animals*, with the opening remarks here quoted to link it to the preceding books. But Albert subsequently made *On the Nature and Origin of the Soul* into a separate work, and discarded the opening chapter because it was no longer appropriate. The chapter is thus not included in Stadler's edition of *On Animals*, and we cite it from the Geyer edition of *On the Nature and Origin of the Soul*.

Albert is here referring to his whole discussion of animals, and not just to the theory of generation; but it is in fact chiefly in connection with the latter that he cites Theophrastus. See also above **354** and **363** nos. 1 and 3; but the information in the latter comes to Albert by a different route, through Pliny.

- 379** (Dubious report concerning Theophrastus) Albert the Great, *Forty Three Settled Problems*, question 35 (*Op. omn.* vol. 17.1 p. 61.74-62.11 Weisheipl)

J.A. Weisheipl, 'The *Problemata Determinata XLIII* ascribed to Albertus Magnus (1241)', *Medieval Studies* 22 (1960) 303-354. B.B. Price, 'The Physical Astronomy and Astrology of Albertus Magnus', in Weisheipl (1980,1) 155-85, at 180-1. Demaitre and Travill (1980) 436. P.M. Huby, 'Soul, life, sense, intellect: some 13th-century problems', in G.R. Dunstan (ed.), *The Human Embryo: Aristotle and the Arabic and European Traditions*, Exeter: Exeter University Press, 1990, 113-22, at 118.

Albert refers to the power of the heavens affecting the development of the embryo, in astrological terms, and cites "the Peripatetics Porphyry and Theophrastus" as attributing the occurrence of monstrosities to this. The citing of Porphyry and Theophrastus together is similar to that in **376A** and **376C**; but the doctrine set out here does not occur in the surviving works of either writer.³⁴⁹ Porphyry's treatise *On what depends on us*, cited by Stobaeus, refers to the stars in

³⁴⁹ Weisheipl (1960) 49 n. 58 cites Porphyry, *Introduction to Ptolemy's On the Influence of the Stars* (i.e. to the *Tetrabiblos*), and Theophrastus in **377**. Porphyry op. cit. speaks of the power of the sun over coming to be and speaks in this regard of *sperma* and *katamênon* (p. 181.50-182.1 of the edition of 1559); the treatise *To Gaurus, on how embryos receive soul*, perhaps also by Porphyry, discusses the connection between astrological influences and the moment of birth (K. Kalbfleisch, 'Die neuplatonische, fälschlich dem Galen zugeschriebene Schrift Πρὸς Γαῦρον', etc., *Abh. Berl.* 1895, phil.-hist. Kl., 180, at 57.3ff.; A.-J. Festugière, *La révélation d'Hermès Trismégiste 3, Les doctrines de l'Âme*, Paris: Librairie Lecoffre (Grabalda), 1953, at 297.) But neither of

the context of the reincarnation of souls as human or animal.³⁵⁰ There is no reference here to the birth of animal-like monstrosities *from human parents*, however. Peter Kingsley suggests to me that the freak monstrosities of Proclus *On Plato's Republic* II.61.5-6 Kroll (and 60.23-4) might derive from Porphyry;³⁵¹ but the sources of Albert's information, and in particular the reason for his supposing a connection with Theophrastus, remain unclear.³⁵²

- 380** Constantine Porphyrogenitus, *Summary of the Research(es) concerning Living Creatures of Aristophanes of Byzantium* 1.98 (*Suppl. Arist.* vol. 1.1 p. 29.19-21 Lambros)

Literature: Rose (1863) 371-2; id. (1886) fr. 285.15 (p. 224). Lambros (1885) xiv. Joachim (1892) 7. Regenbogen (1940) 1425, 1429-31. T. Hopfner, *Plutarch über Isis und Osiris*, Prague: Orientalisches Institut, 1940-1, repr. Hildesheim: Georg Olms, 1991, vol. 2.193. id., *Fontes Historiae Religionis Aegyptiacae*, Bonn: Marcus and Weber, part 4 (1924) 652, part 5 (1925) 867. J.G. Griffith, *Plutarch's De Iside et Osiride*, University of Wales, 1970, 462-3. LSJ s.v. ὑπηνέμιος.

For Constantine Porphyrogenitus, Aristophanes of Byzantium and the title of the work compiled at Constantine's bidding see above on **350-83**, Sources. The present text first notes that woman is the only two-footed creature that brings forth live young, rather than eggs like the birds, and then goes on to assert—apparently—that woman is the only creature, bringing forth live young rather than eggs, that can bring forth without being impregnated.³⁵³ So interpreted, the text

these texts provides a complete parallel to the present passage. For lines 11-14 Weisheipl (1960) 49 n. 59 compares Ptolemy *Tetrabiblos* 3.3; in fact the fuller discussion is in 3.8.

³⁵⁰ *Ecl.* 2 170.15ff. Wachsmuth. (I owe this reference to Peter Kingsley.) The sense in which the stars *determine* the reincarnation is however a qualified one, for Porphyry's argument is that the souls, in choosing how to be reincarnated, choose their own horoscope as well. Cf. A. Bouché-Leclercq, *L'Astrologie grecque*, Paris: Leroux, 1899, 601-2; D. Amand, *Fatalisme et liberté dans l'antiquité grecque*,² Amsterdam: Hakkert, 1973, 165.

³⁵¹ Proclus does not himself name Porphyry here, however, so he could not be Albert's source.

³⁵² I am grateful to Walter Cockle, Peter Kingsley, and Charles Burnett for discussion of this text.

³⁵³ Literally, that can bring forth *hupênemia*, the regular term for the "wind-eggs", that is unfertilized eggs, of birds. For the application of the term to viviparous rather than oviparous generation cf. Lucian *On Sacrifices* 6, who calls Hephaestus the *hupênemios* child of Hera, as having no father.

indicates two ways in which woman is like the birds, in being two-footed and in bringing forth without impregnation; though it is not clear whether it is being claimed that these two similarities are connected, and there is the crucial difference, which the passage completely ignores, that the wind-eggs produced by birds are not fertile and do not in fact produce offspring.³⁵⁴

The apparent claim that women can produce young without intercourse is then supported, as our text stands, by the observation that Theophrastus testified that Aristotle said that "the so-called Osiris" is produced in this way. The form of the reference—Theophrastus cited as a source for Aristotle—is strangely roundabout (though cf. **350** no. 2), and it is not clear whether "in the fifth book of *On Living Creatures*" is intended as a reference to a work by Theophrastus or by Aristotle, though both Lambros and Regenbogen suppose the former. There is in fact no such reference in the extant works of Aristotle.³⁵⁵

It is clear however that there is some dislocation in our text; hence the emendations by Reeve, either reading "... without being impregnated, <like> the so-called Osiris in Egypt. Theophrastus..." or deleting the first occurrence of the reference to Osiris, as in our text. Moreover, the assertion that human mothers produce young by parthenogenesis is blatantly un-Aristotelian: Aristotle insists that "*wherever* there is male and female in a species, the female cannot generate by herself".³⁵⁶ However, *HA* 10.7 638a22 ff. likens the *mola uteri* in women to the wind-eggs (*hupênemia*) of birds, and in *GA* 4.7 776a9 it is asserted that *mola* has only been observed to occur in women and not in other living creatures, the reason given being that the

³⁵⁴ The *hupênemion ôion* laid by Night at Aristophanes (of Athens), *Birds* 695 did hatch out—but that could be part of the joke. The illogicality is indeed present in the application of the word to Hephaestus too (above); perhaps it reflects emphasis on the female, without being fertilised, producing *something*, whether live young or egg, the question whether the egg itself then produces anything being regarded as less central. *HA* 10.6 637b35 regards birds' laying wind-eggs as an example of generation; *ibid.* 10.7 638a22 ff. however likens the wind-eggs of birds, which are discharged, to the *mola uteri* in women, which is not. See further below.

³⁵⁵ If the reference were to the Theophrastean work *On Living Creatures* and its seven books were to be identified with the seven following titles in Diogenes in order (see above, on **350** no. 1), the reference would be to *On Creatures that Remain on Dry Land* (**350** no. 8), which, as Regenbogen (1940) 1425 and 1429-30 notes, hardly seems appropriate. **350** no. 5c would hardly be relevant, since we are not dealing with *spontaneous* generation; **137** no. 10b is itself uncertain. Joachim (1892) 7 suggests that the reference might be to the fifth book of **350** no. 2. But the present text provides such dubious evidence that it is unwise to build anything on it either for or against the identification of the titles.

³⁵⁶ Balme (1962) 98, citing *GA* 741b2, 750b28, 760a20; my italics.

menstrual flow is greater in women (cf. *GA* 4.6 775b5). Possibly then an original statement that women alone “produce *hupênemía*”, in the sense of uterine mole, has at some stage been misunderstood³⁵⁷ as a reference to parthenogenesis and had the reference to Osiris added to it as a gloss, by someone whom I will for the moment call X and distinguish from Aristophanes himself. (We will return later to the questions of the date of X and his relation to Aristophanes.) Emendation will then be unnecessary,³⁵⁸ the text in effect running “... without being impregnated (the so-called Osiris in Egypt. Theophrastus... *On Living Creatures*)”.

This however does not explain the reference to Osiris, or its attribution to Theophrastus. A “so-called Osiris” *was* indeed said to be born without intercourse, but not from a human mother; for Plutarch, *On Isis and Osiris* 43 368c, describes the sacred Apis-calf as an image of Osiris, and says that it was believed to be produced without the involvement of a bull, when the light of the moon fell on a cow in heat.³⁵⁹ Possibly Theophrastus mentioned this belief,³⁶⁰ and X not only misinterpreted the text of Aristophanes but also misunderstood Theophrastus, taking him to refer to a human rather than a bovine mother. There is after all no reference to *human* parthenogenesis in what is cited from Theophrastus in our text; that is a connection made by X.³⁶¹

³⁵⁷ Our translation “produces offspring without being impregnated” can therefore hardly stand as a representation of the presumed *original* sense. The uterine mole is produced when the female emission has not had the male one mixed with it (*HA* 10.7 638a22). The application of *tiktein* to uterine mole might seem strained, but Aristotle uses it of cases where the mole is eventually shed (*GA* 4.7 775b33, *HA* 10.7 638a17; earlier in these two passages, at 775b27 and 638a10, the reference *may* be rather to the initial production).

³⁵⁸ I am grateful to Vivian Nutton for pointing this out.

³⁵⁹ That the Apis-calf was believed to be produced when light from heaven fell upon a cow is already reported by Herodotus 3.28; so too Pomponius Mela 1.9.58 and Aelian, *On the Nature of Animals* 11.10. (Griffith comments that there is no trace of the connection with the *moon* in native Egyptian legend). Walter Cockle points out to me that the initial name of the god whose cult was a fusion of those of Osiris and the Apis bull, at Memphis in the fourth century B.C., was Osorapis, replaced from the second century B.C. by the more familiar Sarapis: each Apis bull became Osiris on its death and mummification. Dr Cockle further speculates (i) that the early development of the cult is at exactly the right time for Theophrastus to have taken an interest in it (and see the next note); (ii) that “Osiris” in our text may stand for an original “Osirapis”. Textual corruption, or the unfamiliarity of the earlier name, may then have aided the confusion.

³⁶⁰ For interest in Egyptian religion on his part cf. **584A.2**.

³⁶¹ The story of the Apis-calf was so well known that some sources did not go out of their way to stress that it was a cow and calf that were involved; thus Plutarch

It may not be irrelevant that the Apis calf was identified by the Greeks³⁶² with Epaphus, the child of Io who combines human and bovine forms. Epaphus was named from his being fathered by Zeus “with a touch”—only.³⁶³ The touch of Zeus’ hand is indeed a different matter from impregnation by celestial light; but it may be noted that Plutarch, referring to gods begetting children on mortal women, refers to them doing so not as a mortal man would but “through other touchings”, *haphai*,³⁶⁴ and shortly afterwards refers to Apis being produced by the touch, *epaphê*, of the moon.³⁶⁵

There is a parallel to the text produced by X in Hesychius, on “Osiris”:³⁶⁶

αἱ ἐν Αἰγύπτῳ (γυναῖκες)³⁶⁷ ὑπηνέμια τίκτουσι, τὸν λεγόμενον Ὅσιριν [γυναῖκες].

The women in Egypt produce offspring without being impregnated³⁶⁸, the so-called Osiris.³⁶⁹

It seems likely that Hesychius is dependent on X, rather than X having intruded material from Hesychius into the text we now find in Constantine. For the text of Constantine shows traces of dislocation which may be due to X’s activity, while that of Hesychius does not;³⁷⁰ and, while the text of Constantine says that parthenogenesis

himself, at *Table-Talk* 8.1 718B, refers to the story but does not explicitly say that it related to a calf.

³⁶² Herodotus 2.153; Aelian 11.10. Epaphus was also identified as the founder of Memphis (cf. n. 359 above); art. ‘Epaphos (1)’, *RE* 5.2 (1905) 2708 (Escher). (I owe this point to Walter Cockle).

³⁶³ *ephaptesthai*; cf. [Aeschylus], *Prometheus* 850. The scholium on 844 (a, p. 203 in C.J. Herington, *The older scholia on the Prometheus Bound*, Leiden: Brill, 1972) says that the touch restored Io to human form and that she then bore the child; but the restoration of her shape and the conceiving of the child clearly go together. Aeschylus, *Suppliants* 312 refers to Zeus as *begetting* by means of the touch, and another scholium on the *Prometheus* (850, p. 271.28 in G. Dindorf, *Aeschyli Tragoediae*, etc., vol. 3 *Scholia*, Oxford: e typographeo academico, 1851) specifies that Zeus’s touching sufficed instead of his seed.

³⁶⁴ Plutarch, *Table-Talk* 8.1 718a.

³⁶⁵ In 718b, cited above.

³⁶⁶ No.1408, vol. 2 p. 782 Latte.

³⁶⁷ Transposed by Latte on the basis of our present text.

³⁶⁸ Literally, “bear *hupênemia*”, as in our text.

³⁶⁹ Höpfner in the index to *Fontes*, p. 867, refers to the Hesychius text (presumably; the page reference in his collection is correct, but he names Stephanus of Byzantium) but simply comments that it is corrupt.

³⁷⁰ There is no context given in Hesychius: the quoted passage constitutes the entire entry.

occurs in “woman”, using the generalising singular and leaving it open whether “the so-called Osiris” is an illustrative example or the only instance, Hesychius says that “*women*” in Egypt produce “the so-called Osiris”, as if parthenogenesis was a pretty regular occurrence there and Osiris the regular name for the product. It seems likely that Hesychius’ account is a further distortion of X’s creation.

What, finally, was the date of X, and was he identical with Aristophanes of Byzantium? Lambros and Regenbogen treat our text as a report of Theophrastus by Aristophanes himself; Lambros further argues that all the material in the sections of Constantine’s epitome that come from Aristophanes³⁷¹ is Hellenistic in origin, and that Constantine’s first book, from which our text comes, derives entirely from Aristophanes. Moreover, Latte in his annotation *ad loc.* derives the Hesychius entry from Diogenianus, who compiled an epitome of the lexicon of Pamphilus, and this again suggests a Hellenistic source. But significantly, while the other points about human reproduction in this part of Constantine’s discussion can be related to extant Peripatetic texts, as Lambros’ apparatus shows, and are relatively orthodox in doctrine, our passage is the decided exception; it therefore seems reasonable to distinguish X from the principal compiler represented in Aristophanes’ text, and if the latter was Aristophanes himself X must be later.

How much later? On the hypothesis advanced here, and supposing the Osiris entry in Hesychius is not itself an interpolation there, Hesychius provides a *terminus ante quem*; he probably wrote in the fifth century A.D., Diogenianus in the second century A.D., Pamphilus in the first century A.D. It might be thought odd for Osiris to be cited as an example of parthenogenesis after the start of the Christian era, when a more famous example would readily suggest itself; but if we are dealing with someone who simply jotted down a misinterpreted memory of Theophrastus of which he was reminded by a text he was also misinterpreting, such considerations may hardly apply. And if a confusion with Epaphus has anything to do with it, it seems more likely at a late date than at an early one.³⁷²

³⁷¹ As opposed to that from Aelian, Timotheus of Gaza, and the other sources discussed on Lambros pp. xiii-xiv.

³⁷² I am grateful to Michael Reeve, Alan Griffiths, Walter Cockle and Vivian Nutton for discussion of the present text. They are not to be held responsible for the use I have made of their suggestions.

- 381** Athenaeus, *The Sophists at Dinner* 9.46 391E (BT vol. 2 p. 354.2-5 Kaibel)

Rose (1863) 372.

For the lustfulness of fowls cf. *GA* 2.7 746b1, 3.1 749b15, *HA* 6.9 564b11; and for Theophrastus' interest in comparing wild and domesticated *plants* see below on **384-435**: Doctrine. Possibly there is a connection between what is said here about the males wanting to mate in the morning, the females later in the day, and the discussion in [Aristotle] *Problems* 4.25 (citing Hesiod, *Works and Days* 582, 586), and 4.28, of human males being less inclined to intercourse in the summer and women more so, the explanation there given being that males are naturally hotter than females. It is impossible to say from what Theophrastean work this report derives; **350** no. 11 (or no. 1, if a separate work) suggests itself, but compare **373** above.

- 382** Aelian, *On the Nature of Animals* 15.16 (BT vol. 1 p. 379.16-21 Hercher)

Rose (1863) 372. Flashar (1972) 149-50.

The story here contradicted by Theophrastus is told by Herodotus 3.109, Antigonus 21.4, Aelian himself at 1.24, Nicander *Remedies* 128, and *Mirabilia* 165.³⁷³ All but Antigonus say that the young act in this way in revenge for the mother's biting off the head of the father at the time of coupling. *HA* 5.34 558a28-30 asserts that the viper is externally viviparous but internally oviparous, and that the young burst the internal *egg* or sometimes eat through it.

In the last line "it cannot hold out" could refer either to the female viper or to its belly.

- 383** (Report of surviving Theophrastean works) Geoponica, or Cassianus Bassus, *Selections on Farming* 15.1.20 (p. 434.11-15 Beckh)

Rose (1863) 344. Gemoll (1884) 62-4. Oder (1890) 64 n. 2. Joachim (1892) 47-9. Wellmann (1928) 28-9. J. Bidez and F. Cumont, *Les mages hellénisés*, vol. 2, Paris: Les Belles Lettres, 1938, 194-6. Hoffmann-Aleith (1949) 347. Capelle (1955). Balme (1962). Amigues (1988) 127; (1989) 123. Battagazzore (1993) 204-5.

³⁷³ Cf. Gossen and Steier, art. 'Schlange', *RE* 2A1 (1921) 539. Flashar derives *Mirabilia* 165 from Theophrastus *On Creatures that Bite and Sting*, in spite of the conflict with the present passage. See above on **360-1**, ad fin.

The *Geoponica* in its present form was compiled under the patronage of Constantine Porphyrogenitus in the 10th century A.D., drawing on the work of Cassianus Bassus in the sixth century A.D., itself a combination of the work of Anatolius (for whom see further below on **395-6**) and of Didymus. Cf. Christ-Schmid-Stählin (1920) 291-2; Hunger (1978) 273-4.

The whole of *Geoponica* book 15 ch.1 is headed as coming from “Zoroaster”; but there are problems concerning the *Geoponica*’s citations of its sources, especially in chapter headings³⁷⁴, and Bidez and Cumont (above) reject the attribution. Wellmann (1916) 50-1 and (1928) 28-9 argued that most, but not all, of the chapter in fact derived via Pamphilus from Bolus, our section (and its sequel in 21-3; see below) being one of the exceptions. Wellmann’s arguments do not however in fact seem to exclude an attribution of the present section to Pamphilus.

The text here attributes several doctrines to Aristotle and to Theophrastus; (i) that animals are generated spontaneously, (ii) that they are generated from decaying earth;³⁷⁵ and also that (iii) living creatures and (iv) plants undergo changes of type.

(i) is attested for Theophrastus at *On Fish* (**350** no. 8) §§9 and 11, and in **359A**,³⁷⁶ though none of these texts refers specifically to (ii) the decaying of *earth*. *CP* 1.5.5 does however refer to the spontaneous generation of animals occurring when the earth is warmed and the mixture (of earth and water)³⁷⁷ is altered by the sun. Earth is mentioned as a source of both plants and animals at *CP* 1.1.2.³⁷⁸ Aristotle at *GA* 3.11 762a11 says that the spontaneous generation of shellfish is *accompanied* by decay, but that the decay is of the residues not used up in the new creature; however, Balme (1962) 101 points out that this statement appears to be unique in Aristotle, and that *HA* 5-6 regularly attribute spontaneous generation to decay. Theophrastus at *CP* 1.1.2 and 2.9.14 refers first to decay but then

³⁷⁴ Cf. Oder (1890) 63-4.

³⁷⁵ (ii) is probably explanatory of (i).

³⁷⁶ Cf. also *HP* 5.4.5, 8.11.2, *CP* 1.5.2, 2.9.6, 3.22.4-6, 4.12.12, 4.14.5, 5.9.3, 5.18.2, most of which mention decay. Capelle (1955) 162-9; Balme (1962) 102-4.

³⁷⁷ Einarson-Link (1976-90) vol. 1 p. 41 note (d) ad loc.

³⁷⁸ The spontaneous generation of *plants* is mentioned by Theophrastus also at *HP* 3.1.5-6, *CP* 4.4.10; he argues at length that many alleged cases are not so in fact, being due to seeds brought from elsewhere or by seeds too small to be detected (*HP* loc. cit., *CP* 1.5.2-5; and further below. See also on **400** for the generation of truffles).

corrects this by referring rather to alteration.³⁷⁹ *HP* 3.1.5 refers to “a sort of decay” (*sêpsis tis*) of earth and water.³⁸⁰

As for (iii) and (iv), Theophrastus discusses changes in plants in *HP* 2.2.4-2.4.3.³⁸¹ At the end of this discussion he says (2.4.4) that it would seem more surprising if such changes occurred in animals, but recognises (a) changes in colouring according to the season,³⁸² (b) the alleged change of the water-snake (*hudros*) into a viper (*echis*) when marshes dry up,³⁸³ and (c) the change of caterpillar (*kampê*) to chrysalis and chrysalis to butterfly (*psuchê*)³⁸⁴ while commenting that (c) is not analogous to changes in plants. It is clear that it is this passage that lies behind line 3 of our text as far as Theophrastus is concerned, for our extract is immediately followed in the *Geoponica* by the observation that “they”—i.e. Aristotle and Theophrastus—say that (A) caterpillars turn into butterflies (434.15-17), (B) other caterpillars turn into beetles (*kantharides*: 434.17), and (C) the water-snake turns into a viper (434.18), before going on to discuss seasonal changes; (A) and (C) both occur in *Research on Plants* 2.4.4 as (c) and (b) above respectively.³⁸⁵

Regenbogen argued ([1940] 1426, cf. 1444 and [1937] 470-1) that Theophrastus was more sceptical about spontaneous generation than was Aristotle. Capelle (1955) 170-3 replied that what Regenbogen interpreted as scepticism was rather Theophrastus’ characteristic readiness to consider different possible causes, comparing *On Fish* §11; cf. above at n. 213, and below on **400**. The whole issue is discussed

³⁷⁹ For decay as a source of spontaneously generated plants cf. also *CP* 1.5.2.

³⁸⁰ See also above on **350** no. 5.

³⁸¹ Cf. also *CP* 2.13-16, 4.4.7. The topic was of interest in connection with theory of generation, being explained by an analogy between the soil’s contribution to plants and the mother’s contribution to animals; *GA* 2.4 738b35, *CP* 4.4.9-10. Tortzen (1991) 85.

³⁸² For which cf. also *CP* 2.16.6, *CP* 4.5.7, remarking that these are like bodily affections (*pathê*) rather than changes (*metabolai*), and *HA* 9.49b 632b14-633a28. Joachim (1892) 47-9 suggests that the topic was discussed by Theophrastus in *On Creatures Produced Spontaneously* (= **350** no. 5c) precisely to distinguish such changes from true spontaneous generation.

³⁸³ Amigues (1988) 127 explains that the water snake *Natrix maura*, resembling a viper, could be mistaken for one if drought drove it from its normal habitat into that of a viper.

³⁸⁴ Cf. *CP* 2.16.7; 4.5.7.

³⁸⁵ (A) occurs both in *HP* 2.4.4 as (c) and in *HA* 5.19 551a13; (B) occurs in *HA* 5.19 552b1 but not in Theophrastus; (C) occurs as (b) in Theophrastus, but not in Aristotle. For (C) cf. also Schol. Theocr. 7.22 and Nicander *Remedies* 414ff.—Oder (1890) cites *HP* 2.6 as the source for **383**, but this must be a mistake.

with reference both to Aristotle and to Theophrastus by Balme (1962), who contrasts Aristotle's view in the *Metaphysics* that the same creatures can be produced either from seed or spontaneously³⁸⁶ with the sharp distinction in the biological works between creatures *regularly* generated from inanimate matter and those that never are,³⁸⁷ and notes that Theophrastus agrees with the *Metaphysics* rather than with the biological works of Aristotle, holding that the same plants and animals can come either from seed or from spontaneous generation (*CP* 1.1.2, 1.5.1, 5.4.6). He therefore suggests that Theophrastus was writing *before* Aristotle's biological works. But he also notes that Theophrastus, while characteristically concluding his discussion of whether certain cases of apparently spontaneous generation are in fact such with the statement that further investigation is required (*CP* 1.5.5; cf. Battezzatore [1993]), is concerned to relate spontaneous generation, in so far as it does occur, to *regular* causal patterns. See above on **359A**, on **363** no. 5, and below on **400**.

³⁸⁶ *Metaph.* Z 7 1032a30.

³⁸⁷ Citing notably *GA* 1.1 715b8-15; Balme (1962) 100.

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384-435 *Bibliography:* Hort (1916-26). Senn (1933), (1956). Strömberg (1937). Regenbogen (1940) 1435-79. Einarson-Link (1976-90). Scarborough (1978). Lloyd (1983) 119-35. Wehrli (1983) 507-8. Wöhrle (1985). Morton (1986). Amigues (1988), (1989) and (forthcoming). Crombie (1994) vol. 2 1252-8, 163-4.

OVERVIEW: SOURCES

The reports in ancient authors of Theophrastus' views on particular plants and their characteristics require a different treatment in this collection to most reports on other topics. For Theophrastus' major botanical writings survive, and a large number of the secondary reports can easily be identified as more or less accurate references to portions of these extant works. These are listed in **413** (for *Research on Plants* = *HP*) and **417** (for the *Explanations of Plants* = *CP*).

There remain a number of reports which either have no counterparts in the extant works as we have them, or else combine material found there with other material which is not; in some cases quite specific references are given. Simple error is sometimes the likely explanation; but the number of these mismatches, especially in certain authors such as Athenaeus (the compiler, in about 200 A.D., of a treatment in the form of a symposiastic dialogue of all sorts of topics relating to symposia, and hence in particular of foodstuffs), is such that it is necessary to suppose either that our texts of Theophrastus' botanical works have suffered major omissions, or else that Athenaeus and others were using expanded versions of the text to which additional material had been added. That the same phenomenon occurs in reports of Aristotle's writings on zoology has already been noted (above, nn. 95-6).³⁸⁸

Regenbogen, following Wellmann,³⁸⁹ noted how these texts come in sequences in Athenaeus where material from different parts of *HP*

³⁸⁸ On the relation of [Aristotle] *Problems* 20 to Theophrastus' work cf. Flashar (1962) 320-1.

³⁸⁹ Wellmann (1916) 58; Regenbogen (1940) 1443-4.

is brought together and intermingled with that from other Theophrastean works and indeed from other authors, and argued that it is unlikely that the excerpting was done by Athenaeus himself; Athenaeus will then have used a compilation, perhaps the *Leimôn* or *Meadow* by Pamphilus (which in spite of its name, potentially misleading in the present context, was a general miscellany, not just concerned with plants).³⁹⁰ But Regenbogen also argued that our version of *HP* is incomplete and that the extra texts show this; in particular, many of the references which do not correspond to our texts are to "book 2", and Regenbogen argued that our present book 2 is in fact a combination of two sections which were originally separate, a general section (2.1-4) and one concerned with particular plants (2.5-8), and that the missing material has fallen out from between the two.³⁹¹ Amigues (forthcoming) however argues for the unity of book 2.

In the present collection the reports that do not correspond to our texts of Theophrastus' botanical works are arranged in the sequence of their explicit references to, or affinity of subject-matter with, the contents of *HP* (392-412) and *CP* (414-416). We have made no attempt to take account of texts which are simply summaries or collections of excerpts from the surviving botanical works, such as that printed from a Vatican MS by Schneider.³⁹² To do this belongs more properly to editions of the extant works themselves.

For the inclusion under Botany of texts relating to Theophrastus' treatment of flavours and odours see below on 384 nos. 2f, 2g, 3-5. Theophrastus' treatment of natural flavours and odours in *CP* 6 survives, as does his treatment of artificial odours in *On Odours*; so here too the texts we cite are supplementary to what survives. (Theophrastus' treatment of wine and olive-oil, however, to which 425-9 relate, is lost). However, it does not here seem that we have to do with interpolated texts; the existence of citations which do not exactly match the surviving works is rather a result of later writers' commenting on Theophrastus' views in general terms or adapting his discussions to their own ends. Most of the citations come from Galen; but whereas on the topic of human physiology it seemed that

³⁹⁰ Cf. Hoffmann-Aleith (1949); also Wehrli (1967-78) vol. 9 p. 40.

³⁹¹ Regenbogen (1934) 201-3.

³⁹² Schneider (1818-21) vol. 5 185-8. Cf. in general Regenbogen (1940) 1436-7; Einarson (1976) 74-6.

Galen was using Theophrastus' name along with many others to lend authority to general views he himself shares, here it appears that he is using specific Theophrastean material but using it in his own way and for his own purposes. The hypothesis of an intermediate source does not in this case seem necessary, though it has been suggested by some. Cf. especially below on **424**.

Of the other ancient authors who cite Theophrastus' botanical writings, Apollonius the paradoxographer has been mentioned in the discussion of **350-383** above; cf. Regenbogen (1940) 1439. Varro's use of Theophrastus is discussed by Regenbogen (1940) 1439-40; see below on **386** and on **413** no. 3. Pliny in his *Natural History* makes frequent use of Theophrastus on botany as on other topics (see **138**; Morton 89-90), and it is clear on some occasions that he was using Theophrastus directly (cf. **408**; such modifications and misunderstandings as those in **413** nos. 107, 110, and, from contexts other than botanical, **209** nos. 1, 13, 14 and **363** nos. 5-6, are probably due to Pliny himself). However, Regenbogen (1940) 1442 argues that Pliny is sometimes using Theophrastus not directly but through an intermediary. A distinction should be drawn between Pliny's books on botany proper and those on pharmacology, where Scarborough (1986) 68 and 75-6 argues that Pliny more often uses intermediate sources. There are many parallels with Theophrastus' botanical writings in passages of Pliny where Theophrastus is not expressly named; there are also such parallels in Plutarch in addition to those that refer to Theophrastus by name (see below on **413** no. 41). For Dioscorides' use of Theophrastus see below on **413** no. 103. In botany as elsewhere isolated pieces of information are incorporated, with the name of Theophrastus still attached, into the lexicographical tradition (in its broadest sense, including works like Galen's *Explanation of Hippocratic Expressions*) and into scholia, and may then be transmitted independently with the hazards of distortion that this involves; see for example below on **411**.

OVERVIEW: DOCTRINE

Theophrastus' contributions to botany cannot be overstated. He so far surpassed his predecessors that the history of the subject in the West can effectively be said to begin with him; it is to him that we owe the first systematic discussion defining the various parts of plants

(*HP* 1) and the identification of the range of factors—structure, mode of reproduction, habitat—that a study of plants requires. However, in approaching botany in this way it seems, as has recently been argued by Gotthelf (1988), that Theophrastus is to a large extent working within a similar framework to that found in Aristotle's zoological works, while trying to apply it to a less tractable subject-matter. His task is thus, first to classify the differences between plants, and then to seek explanations for them; see below on **389**.

It is true that Theophrastus has interesting things to say about the way in which art helps nature in the cultivation of plants, *both* art and nature setting out to achieve what is best, and also about whether the true end of a tree's growth is to produce fertile seed or edible fruit—edible by humans, that is.³⁹³ He even suggests that what is unnatural may become natural with time.³⁹⁴ But these points are developments and modifications within the Aristotelian framework, rather than the replacement of it by a different perspective altogether. Similarly, too, with Theophrastus' treatment of botanical species and varieties, where differences in degree can constitute differences in kind,³⁹⁵ for Aristotle too regards differences in degree as not constituting differences in *genos*,³⁹⁶ and this seems to imply that they *can* constitute differences in *eidos* or species.³⁹⁷

On Theophrastus' doctrine of flavour and odour, the latter especially raising particular problems, see further below, on **418-24** and **430-4** respectively. For Theophrastus' interest in medicinal uses of plants see Scarborough (1978) and Preus (1988), and on his sources of botanical information, especially the "root-cutters", see Kirchner (1874) 499-514; Einarson-Link (1976-90) vol. 1 xix-xxiii; Scarborough (1978), (1992) 149-50; Lloyd (1983) 119-35; Amigues (1988) xx-xxx.

³⁹³ Cf. *CP* 1.16.

³⁹⁴ *CP* 4.11.7.

³⁹⁵ Cf. *HP* 1.1.6-7, and our **438**; W.W. Fortenbaugh, 'Theophrastus on Emotion', in W.W. Fortenbaugh, P.M. Huby, and A.A. Long (eds) (1985) *Theophrastus of Eresus: On his Life and Work*, New Brunswick: Transaction (Rutgers University Studies in Classical Humanities, 2) 209-29, at 227 n. 5, and references there. Cf. also, for Aristotle, C.D.C. Reeve, *Practices of Reason: Aristotle's Nicomachean Ethics*, Oxford: Clarendon Press, 1992, 19; and below on **421**.

³⁹⁶ *HA* 1.1 486a22; *PA* 1.4 644a17ff.

³⁹⁷ Cf. Lennox (1987,2).

384 List of Titles Relating to Works on Botany1 *Research on Plants (HP)*

Texts, translations and commentaries: Wimmer (1866) 1-163. Hort (1916-26), with English translation. Amigues (1988-) in progress, with French translation and commentary.

On the title and structure of the work: Schneider (1818-21) vol. 5 233-4. Rose (1863) pp. 261-4. Regenbogen (1934), (1940) 1373, 1435-6, 1439. Senn (1956) 5-42. Keaney (1968). Wehrli (1983) 486-8. Sollenberger (1988) 15-16, 22 nn. 5-9. Amigues (1988) xxxv-vi, and (forthcoming). Einarson-Link (1976-90) vol. iii 459.

Research on Plants is the title under which the work is transmitted in the MSS; Theophrastus himself in the *Plant Explanations (CP)* refers to the *Research on Plants* simply as “the Researches”, but the omission of “On Plants” in this context is natural enough. Other ancient authors frequently refer simply to “Theophrastus *On Plants*” (1g).³⁹⁸

The variation in title is linked by Keaney (1968) with a major problem in the ancient references to the work. There are in fact two difficulties. (A) Diogenes Laertius in his list of Theophrastean titles (**384** no. 1c) gives *HP* ten books, whereas standard editions now have only nine (but see below). (B) A number of ancient authors cite what is now book 8 as book 7, and what is now book 9 as book 8 (cf. below on **413** nos. 86, 89, 92, 108, 109, 115); one of these, Apollonius, at one point cites our book 9 as explicitly the last book of the work (Apollonius 50 = **413** no. 107).

Both (A) and (B) could be explained by confusion between the use of letters to label books as letters (when Z = 6, H = 7, H = 8, I = 9) and the use of letters as numbers (when digamma = 6, Z = 7, H = 8 and H = 9, I = 10. On the general principle cf. Keaney [1968] 296 n. 2). Einarson and Link explain (A) thus (with implications for *CP* as well; see below); in their view the nine books of *HP* were lettered A-I, and these letters were later misinterpreted as numbers,

³⁹⁸ Senn (1956) 40 objects to the rendering “research” or “enquiry”, arguing that it could as well apply to *CP*. But that text is distinguished from *HP* not in that *CP* has theoretical presuppositions where *HP* simply records observations—which would indeed make “research” or “enquiry” rather inappropriate—but by its concern with explanation to which *HP* is preliminary as a study of *differences*. (So Gotthelf [1988]). Cf. below on **389**.

the digamma being added to the lists to make up the total. Discrepancy (B) could be explained in the same way if the authors whose citations are one book too low misinterpreted the number $H = 8$, for example, as the letter $H = 7$. But to explain *both* (A) and (B) in this way involves both the misinterpretation of letters as numbers and vice versa.

Most of the principal MSS of *HP* do in fact contain ten books. But book 10 is simply a repetition, with minor variations, of the latter half of book 9,³⁹⁹ and scholars have sought to explain the reference to ten books in Diogenes rather by the suggestion that one or other of our present nine books was originally subdivided. Schneider, following Hahnemann, argued that book 4 was originally two books; G.R. Thompson, following Kirchner,⁴⁰⁰ rather that book 9 originally had two separate parts, 9.1-7 on the saps of plants (*Peri phutôn opôn*) and 9.8-20 on the powers of roots (*Peri dunameôs rhizôn*) so also Sollenberger (1988) and Amigues (forthcoming). The repeated second half of book 9 is entitled *On the Powers of Roots* in the principal MS U; *On the saps of plants* appears as the title of excerpts from book 9 in MS Monacensis gr. 635; and the two titles appear combined as a single one in the *Excerpta Parisiensia* (cod. Par. gr. 1823; cf. above n. 392).⁴⁰¹ Amigues (forthcoming) further suggests that the two parts of book 9 were originally independent works, *On the saps of plants*, incorporating information from Alexander's campaigns, being composed in Theophrastus' maturity, but *On the Powers of Roots* being an early work.

There remains problem (B), the references to an eight-book *HP* with our books 8 and 9 as books 7 and 8. Regenbogen argued that in the original version of *HP* our book 2 was divided into two, and books 4 and 5 were not yet included, thus giving a total of eight.⁴⁰²

³⁹⁹ Cf. Einarson (1976).

⁴⁰⁰ G.R. Thompson (1941) 11 and n. 20; 31 n. 35.

⁴⁰¹ Joachim (1892) 5 n. 3; Amigues (forthcoming).

⁴⁰² Regenbogen (1934) 203, (1940) 1439, 1446-7. Regenbogen suggested that books 4 and 5 were first added as an appendix by Hermippus and later inserted in their present place. For the division of book 2 cf. also Senn (1956) 9 and 15, and above at n. 391. Senn (1956) argued that the text as we have it is a compilation by Andronicus from three separate groups of books, now forming 1,2 and 4; 5, 8 and 9; and 3,6 and 7 respectively, and that the first two chapters of book 1 are themselves a contamination of two works by Theophrastus, an early one which followed Aristotle in assimilating plants and animals and a later, entitled *On the Differences of Plants*, which emphasised the differences between them. But neither claim has found favour. See also below, nn. 407, 417.

Keaney however showed that the very authors who cite the present books 8 and 9 with numbers one too low also cite book 4,⁴⁰³ and Amigues (1988) that 4.3.7 refers forwards to 6.3 and 6.3.1 back to 4.8.3-4. Keaney's own suggestion is that there was first an eight-book edition of *HP* and then later a nine-book one, the eight-book edition treating books 6 and 7 as a single book (cf. below on **384** no. 1k); and this suggestion is documented and developed by Amigues (forthcoming). Keaney also linked the title *Peri phutôn* with the earlier, 8-book edition, noting that the earliest occurrence of that title which *cannot* be referring to the eight-book edition is Stephanus of Byzantium s.v. *Apsynthos* = **413** no. 108.⁴⁰⁴

- 1a *Research on Plants*. Athenaeus has both *Peri phutôn historia*, “Research on Plants”, where *peri* governs *phutôn*,⁴⁰⁵ and also *Phutôn historia* (without the *peri* at all; literally “Research of plants”, here rendered “Research concerning plants”). But there are also cases where *peri* governs *historias* rather than *phutôn*, and then it is unclear whether or not *peri* is part of the title; thus Athenaeus 2.59 61E = **399** could be “in the work on Research concerning Plants”, or “in the work On Research concerning Plants”. The distinction is in any case somewhat artificial, since titles referred to in a continuous text were not differentiated by capital letters in antiquity.⁴⁰⁶
- 1c *Researches on Plant (Matters)*. The title is ambiguous. *Peri* could govern both *phutikôn* and *historiôn*, the former being an adjective agreeing

⁴⁰³ Apollonius 32 = **413** no. 43, without an explicit book number; Harpocration s.v. *holoschoinôi* = **413** no. 48 citing *HP* 4.12.1 explicitly as book 4. See also below on **384** no. 1l.

⁴⁰⁴ If Stephanus' source here is Bolus of Mendes (third century B.C.), then either Bolus already knew the second part of our *HP* 9 as the ninth book of a *Peri phutôn*, or else the form of the title, and possibly the book number as well, are due to Stephanus rather than to Bolus. See below on **413** no. 108.

⁴⁰⁵ E.g. *en tēi peri phutôn historiāi* at Athenaeus 1.57 31E, 11.41 470F.

⁴⁰⁶ Further grammatical ambiguity theoretically arises where the genitive *historias* could be depending either on a book number or on *peri*: thus at Athenaeus 3.24 82E = **397** *en deuterōi peri phutôn historias* could be [i] “in the second (book) of Research on Plants” (the actual title being *Peri phutôn historia*, and the genitive *historias* depending on *deuterōi*), [ii] “in the second book (of) Research on Plants (*historias* being governed by *peri*, and *peri* being part of the title) or [iii] “in the second (book) on Research concerning Plants (*historias* being governed by *peri*, and *peri* not being part of the title). Similarly at 15.28 681E = **413** no. 64 and Galen, *On the Faculties of Food-stuffs* (*De alimentorum facultatibus*) 1.28.2 = **413** no. 88. But [i] is the natural reading in these cases.

with the latter ("On Plant Researches"); or alternatively *peri* could govern only *phutikôn*, *historiôn* depending on the book numbers ("Researches on Plant (Matters)").⁴⁰⁷

- 1g *On Plants*. Alexander, commenting on Aristotle's statement that further discussion of flavours belongs to the study of plants, says that there is a work by Theophrastus *On Plants* but that none by Aristotle is in circulation (cf. Rose³ p. 209; below on **385, 390**). This seems to have prompted Thomas Aquinas and Peter of Auvergne to attribute to Theophrastus the *pseudo-Aristotle* treatise *On Plants* (which is in fact a translation from an Arabic version of a lost Greek original by Nicolaus of Damascus, though possibly incorporating some Aristotelian material;⁴⁰⁸ the Latin version, which Aquinas and Peter would have used, was then translated back into Greek.) Cf. S.D. Wingate, *Medieval Versions of the Aristotelian Scientific Corpus*, London 1931, pp. 66-7, 102.⁴⁰⁹ See also below, on **389-390**.
- 1k *On Under-shrubs and Herbs*. See Schneider (1818-21) vol. 5 234; Usener (1858) 23; Joachim (1892) 5 n. 3; Regenbogen (1940) 1373, 1451-2; G.R. Thompson (1941) 31 n. 35; Moraux (1951) 211 n. 3; Senn (1956) xiv, 26-7; Keaney (1968) 296; Wehrli (1967-78) suppl. vol. 1 (1974) 78-9; Gottschalk (1987) 1090 and n. 51; Amigues (forthcoming). Hermippus' title (= fr. 55 Wehrli) is reported at the end of book 7 in cod. Urbinas graecus 61, and transferred to the opening of book 8 in cod. Parisinus graecus 2069 and in the Aldine edition. In fact the title, taken from the opening words of book 6, applies to books 6 and 7 together, and Keaney, followed by Amigues (forthcoming),

⁴⁰⁷ Cf. e.g. **384** no. 2a, **727** nos. 2, 3, 6. Senn (1956) 39-41 argued that this was Andronicus' title, Theophrastus himself having used *Research on Plants* (in the singular) for an early work which Senn believed he could identify incorporated in the text as we have it; but this is dependent on Senn's questionable views about the presence of different strata in the text and the editorial activity of Andronicus (see nn. 402, 417).

⁴⁰⁸ G. Senn, 'Hat Aristoteles eine selbständige Schrift über Pflanzen verfaßt?', *Philologus* 85 (1930) 113-40, argues that no genuine work on plants by Aristotle ever existed, the apparent references to it in Aristotelian texts in fact being to the *CP*. Against this, Regenbogen (1937) 474-5.

⁴⁰⁹ On the pseudo-Aristotle *De plantis* cf. Moraux (1951) 109; H.J. Drossaart Lulofs, 'Aristotle's *Peri phutôn*', *Journ. Hell. Stud.* 77 (1957) 75-80; L. Labowsky, 'Aristotle's *De plantis* and Bessarion', *Medieval and Renaissance Studies* 5 (1961) 132-154; B. Hemmerdinger, 'Le *De plantis* de Nicolas de Damas à Planude', *Philologus* 111 (1967) 56-65; Schmitt (1983) 299-300, 308-8.

uses this to explain the anomalous references to *HP* book-numbers by arguing that books 6 and 7 originally formed a single book.

- 11 *On Wild Trees*. [The reference in our text should be to the *third* book.] Cf. Joachim (1892) 5 n. 3. Keaney (1968) 298 and n. 1. G.R. Thompson (1941) 31 n. 35 interprets the title “On Wild Trees: book 3” as the third book of a work of five books—our present *HP* 1-5—entitled *On Wild Trees* as a *whole*.

2 *Plant Explanations (CP)*.

Texts, Translations and Commentaries Wimmer (1866) 165-319. Einarson and Link (1976-90), with English translation and notes. *On Odours* (below, 2g): Wimmer (1866) 364-76. Hort (1916-26) vol. 2 324-89, with English translation.

On the title and structure of the work: Rose (1863) 227-8. Regenbogen (1940) 1402, 1452. G.R. Thompson (1941) 10-24. Einarson and Link (1976-90) vol. 1 xiii, vol. 3 230-1, 460-1. Wehrli (1983) 483-4 (*On Odours*), 489. Sharples (1985) 184; (1992,1). Sollenberger (1988) 16-19. Wöhrle (1988) 3-4.

Diogenes Laertius mentions eight books, as opposed to the six we have. There are various references forward to discussion of artificial flavours and odours that are not taken up in the text as we have it, and this suggests that the discussion of natural flavours and odours in book 6 may originally have been followed by treatment of artificial ones in books 7 and 8. Thus there are references at 2.16.1 to discussion of flavours and odours;⁴¹⁰ at 6.3.3 to discussion of artificially produced flavours;⁴¹¹ at 6.20.4 to discussion of artificially produced juices (*chuloi*) and odours; at 6.7.6 to further discussion of wine; and at 6.11.2 to treatment of artificially produced juices, specifically wine and olive-oil.⁴¹² It is natural to take these as references to the lost *On Wine and Olive-Oil*, as was already done by Rose (1863) 227-8.

It is true that wine and oil do not exhaust the topic of artificial flavours, but, especially given the close link drawn by Theophrastus between flavours and “juices” (see below on **419**), they could form a

⁴¹⁰ Cf. also *HP* 1.12.4 with *CP* 6.12.7; G.R. Thompson (1941) 14-16.

⁴¹¹ *chumoi*; but on this passage see also Einarson and Link (1976-90) vol. 3 231 n. 2, and below on **384** no. 3.

⁴¹² G.R. Thompson (1941) 18.

major part of it; the juice of fruits is a major topic in the discussion in book 6, and wine is after all grape-juice which has been altered by human activity.⁴¹³ These considerations prompted G.R. Thompson to suggest that the lost *On wine and olive-oil* (384 2f) may have had a natural place as book 7, and the extant *On Odours* (384 2g) as book 8.⁴¹⁴ Regenbogen took a similar view, but with *On Odours* as book 7 and *On Wine and Olive-Oil* as book 8. *On Odours* 7 and 8 however apparently refer back to discussion of artificial flavours,⁴¹⁵ and this favours Thompson's sequence as against Regenbogen's; the wording in *De odoribus* 7 is ambiguous, but probably (against Hort's Loeb translation, which is misleading) indicates a reference *back* to a discussion of artificial flavours rather than forward.⁴¹⁶ Einarson and Link, while agreeing that *On Wine and Olive-Oil* was indeed "another version or another name" of *Plant Explanations* 7, argue that Diogenes' book numbers for *HP* and *CP* have been erroneously increased by one (see above, on 384 no. 1), and thus regard *On Odours* as a separate work, closely linked with an original seven-book *Plant Explanations* but not part of it. However, the reference forward in *Plant Explanations* 6.20.4 does suggest that both juices and odours were to be dealt with in *Plant Explanations* itself.⁴¹⁷

The principal MS, as Einarson noted (see our text and translation volume) fluctuates between αἰτιῶν (genitive of αἰτίαι, feminine) at the start of book 1 and the end of book 6, αἰτιῶν (genitive of αἴτια neuter) at the end of books 1 and 2, and αἰτιῶν without an accent at the end of books 4 and 5. Indeed in a text written before accents were introduced it would be impossible to distinguish: so 2b might equally well be the genitive of φυτικὰ αἴτια.⁴¹⁸

For discussion of 2e by Dimitri Gutas see the forthcoming commentary on 3A-B.

⁴¹³ Cf. Sollenberger (1988) 17-18, on the relation between *CP* 6.3.3 and the discussion of wine at 6.7.6.

⁴¹⁴ G.R. Thompson (1941) 17-21. There is an apparent reference back in *De odoribus* 5 to *CP* 6.9.4, 6.14.5 and 6.16.7. Thompson indeed suggests (19, 24) that our extant *On Odours* is not the whole of the original *CP* 8 but is a "sizeable fragment" of it. Compare also *De odoribus* 1 with *CP* 6.19.2; G.R. Thompson [1941] 19.

⁴¹⁵ G.R. Thompson (1941) 19-20. Einarson & Link (1976-90) vol. 3 461.

⁴¹⁶ Cf. Regenbogen (1940) 1402; Wöhrle (1988) 12 n. 6.

⁴¹⁷ I am indebted to Dr Michael Sollenberger for discussion of these issues.—Senn's initial account of the development of Theophrastus' botanical doctrines in his (1933) 93-122 (cf. above, nn. 402, 407) was effectively challenged, in so far as it involved the claim that *CP* is an *early* work, by G.R. Thompson (1941) 6-8.

⁴¹⁸ I am grateful to Vivian Nutton for pointing this out.

3 *On Flavours* (or *On Juices*)

Rose (1863) 265. Regenbogen (1940) 1422-3. G.R. Thompson (1941) 10-12, 20-4. Sollenberger (1988) 19. Einarson-Link (1976-90) vol. 3 231 n. 2, 460.

On “flavours” and “juices” see below on **419**. That text, and **418** where *chulos* is described as a differentiation of what is moist, indeed suggest that the translation here should simply be *On Juices*;⁴¹⁹ but we have kept the double translation to emphasise the connection between *chulos* and flavour, absent from English “juice”.

G.R. Thompson suggested that the five books *On Flavours* were books 6-8 of the original eight-book *CP* together with book 9, originally two books (see above on **384** no. 1), of *HP*. Einarson-Link, on the other hand, argue that *On Flavours* was a completely separate work from *CP*, “a collection of information that bore the same relation to *CP* 6-7 as *HP* bears to *CP* 1-5”, interpreting *CP* 6.3.3 as suggesting a more general discussion than that envisaged in the *CP* itself. See also below, on **390**.

At *Meteorology* 2.3 358b23, on the saltiness of the sea, Aristotle refers to the general topic of flavour but says it must be considered elsewhere; at *ibid.* 359b21 he says that the tastes produced by different admixtures of earth have been dealt with elsewhere. (See **212**, and the Commentary on that passage.)⁴²⁰ Alexander comments on the latter passage that the subject belongs to the study (*pragmateia*) of flavours (*chumoi*);⁴²¹ Regenbogen interprets Alexander’s remarks as referring to the present treatise by Theophrastus, but they do not seem so specific as to indicate any particular text.⁴²²

4 *On Fruits*.

Literature: Usener (1858) 12, 16. G.R. Thompson (1941) 31 n. 38. Sollenberger (1988) 20-21. Einarson-Link (1976-90) vol. 3 460.

⁴¹⁹ Again, I am grateful to Vivian Nutton for this point.

⁴²⁰ H.D.P. Lee (*Aristotle: Meteorologica*, LCL 1952, 163 n.(c) ad loc) interprets the latter passage as a reference to *On Sensation* 4 or to a lost work.

⁴²¹ Alexander *On Aristotle’s Meteorology* 89.6; cf. 86.30.

⁴²² Olympiodorus, *On Aristotle’s Meteorology* 167.12 says that *Aristotle* discussed the topic in a treatise of one book (*monobiblos*) *On Flavour* (*Peri chumou*); Regenbogen attributes this to ignorance on Olympiodorus’ part.

This *may* be an alternative title for a particular section of *HP* or *CP*. Einarson-Link suggest a relation to *CP* 5. Sollenberger however argues that discussion of fruit is neither the main topic of that book nor confined to it, and argues for *On Fruits* being an independent work. The credentials of the title are in any case suspect; it is the penultimate item in the last section of Diogenes' list of titles, one of the three appearing without book numbers (our **1** line 290; cf. **350** no. 1 and **137** no. 3) and was bracketed by Usener.

5 *On Honey*

For this work see below, commentary on **435**.

WRITINGS ON PLANTS

385 Cicero, *On Ends* 5.10 (*BT* p. 160.12-17 Schiche)

Piso is here giving a general survey of the activities of the Peripatetics as a preliminary to his exposition of the doctrine on the chief good of "the Old Academy and the Peripatetics"—i.e., of Antiochus of Ascalon. **590**, **482** and **498** come from shortly afterwards in the same survey. Theophrastus already appears here as the writer on plants, Aristotle on animals; cf. **384** no. 1g ad init. and **390**.

386A Varro, *On Farming* 1.1.7-8 (*CB* vol. 1 p. 9.19-10.4 Heurgon)

386B Columella, *On Farming* 1.1.7 (p. 16.19-25 Lundström)

Rose (1863) 270. J. Huergon, *Varron: Économie rurale*, 1, Paris: *CB*, 1978, 97-9.

Varro was a polymath and an older contemporary of Cicero; Columella wrote his treatise on agriculture in 60-65 A.D. Huergon shows that Varro's list of sources is not his own, but is an abbreviated version of that in the earlier work of Cassius Dionysius who translated a work by Mago of Carthage (Varro, 1.1.10); Columella used the same source and compressed the list further. In particular, Hieron II, king of Syracuse in 270-215 B.C., and Attalus III Philometor, king of Pergamum in 138-133 B.C., are all that are left in Varro of Cassius' original list of kings who patronised agriculture, this explaining their heading the list. For Democritus' work on farming cf. Diogenes Laertius 9.48; DK68B26f. The reference to Xenophon is to his extant

Oeconomicus; the work on agriculture attributed to Archytas of Tarentum is assigned by Diogenes Laertius (8.82) rather to another writer of the same name.

Rose rightly argues that these passages relate to the surviving botanical works of Theophrastus, not to a separate discussion of agriculture; cf. **387** below, and for Varro's use of Theophrastus' botanical writings cf. Regenbogen (1940) 1439-1440. (On the question whether Theophrastus wrote a treatise on farming see also below on **395-6**.)

- 387** Varro, *On Farming* 1.5.1-2 (CB vol. 1 p. 23.7-16 Heurgon)

See above on **386A**. The assessment of Theophrastus' works as theoretical rather than practical is noteworthy.

- 388** Galen, *Explanation of Expressions in Hippocrates*, Introduction (vol. 19 p. 64.5-12 Kühn)

Galen is here attacking Dioscurides, his predecessor in commenting on Hippocrates; this Dioscurides is not the author of the surviving *De materia medica* (see below), but a writer of the time of Hadrian, Dioscurides no. (11) in *RE* (vol. 5.1 [1903] 1130-1 [Wellmann]), who edited the works attributed to Hippocrates and compiled a glossary. Both before and after this extract Galen attacks Dioscurides for explaining what was so obvious that it needed no explanation. (Sextius) Niger was an eclectic philosopher and writer on *materia medica* of the time of Augustus (Sextius [10] in *RE*, vol. 2A.2 [1923] 2040-1 [von Arnim]; cf. Wellmann [1889]). For Pamphilus see above at n. 390. Pedanius Dioscurides or Dioscorides of Anazarbus (not "son of Anazarbeus" as in the first printing of our translation) is the first-century A.D. author of the extant *De materia medica*. Crateuas was physician to Mithridates (early 1st century B.C.). Heraclides of Tarentum (also early 1st century B.C.) was a leading Empiricist physician.

- 389** Simplicius, *On Aristotle's Physics* 1, preface (CAG vol. 9 p. 3.5-10 Diels) Rose (1863) 261-3.

This text, following immediately on that cited in the apparatus to **197B**, is one of a group of Neoplatonic texts in which Peripatetic writings on the various aspects of natural science are classified.⁴²³

⁴²³ On these classifications cf. in general I. Hadot, 'The role of the commentaries on Aristotle in the teaching of philosophy', etc., in H. Blumenthal and H. Robinson

Here, as in the preceding reference to *On Metals* in **197B**, the MSS have the plural.⁴²⁴ (For the doubt over whether *On Metals* should be attributed to Aristotle or Theophrastus cf. **137** no. 20 and **197-201**.) The Aldine edition however changed the plural verbs in our present text to singulars, so that the reference is to Aristotle only. Other texts of this type attribute writings on plants unequivocally to Aristotle.⁴²⁵ See further the commentary on **197** in vol. 3, and contrast **384** no. 1g ad init., **385** and **390**.

Simplicius here distinguishes between research (*historikôs*) and explanation (*aitiologikôs*); the distinction is Aristotelian.⁴²⁶ It should not however be supposed, either in the case of Theophrastus or in that of Aristotle, that the works of the former type represent mere collections of facts not guided by any theoretical framework.⁴²⁷ Gotthelf has pointed out ([1988] 122-3) that *CP* 1-5, at least, correspond to Aristotle's *GA* rather than to (e.g.) *PA*; perhaps this is natural, since plants are in Aristotelian terms relatively simple organisms which have generation and nutrition as their only functions.

390 Michael of Ephesus, *On Aristotle's On Respiration* 2.1 480b21-30 (*CAG* vol. 22.1 p. 148.28-149.9 Wendland)

Rose (1863) 263-6. Regenbogen (1940) 1423.

(eds.), *Aristotle and the Later Tradition* (Oxford Studies in Ancient Philosophy, supplementary volume, 1991) 175-189, at 179-181. She stresses that for the Neoplatonists, starting from Proclus, all Aristotle's detailed writings on natural science are not properly philosophical—for Proclus, the only Aristotelian writings on nature that are philosophical are the *Physics*, *On the Heaven* and *On coming-to-be and passing away*).

⁴²⁴ MS D however has the singular in the last clause concerning plants. Aristotle's treatises *On Sleep and Wakefulness* survives (Bekker pp. 453b-458a); a work *On Sleep and Dreams* is also attributed to Theophrastus (**328** no. 11) and was still accessible to Simplicius' colleague Priscian of Lydia (see the apparatus to **341**). The reference in our text is probably to the Aristotelian work; but reference to the Theophrastean work cannot perhaps be excluded.

⁴²⁵ So Simplicius *On Aristotle's Categories* 4.12, *On Aristotle's On Heaven* 3.4 (in the sequel to **197B**), Olympiodorus *On Aristotle's Meteorology* 1.13, 4.4 (cf. **197C**), Philoponus *On Aristotle's Physics* 2.3 (in the sequel to the passage cited in the apparatus to **197C**), *On Aristotle's On Coming-to-be and Passing-away* 2.17 (cf. the apparatus of **197C**), 7.16, Elias *On Aristotle's Categories* 113.33, 115.34. Rose (1863) loc. cit. Moraux (1951) 109 argues that these reports in Simplicius and Philoponus do not rest directly on acquaintance with any actual text.

⁴²⁶ Cf. Aristotle *HA* 1.6 491a9, *PA* 639a12, 650a31, *Progression of Animals* 704b10, and *CP* 1.1.1; Lennox (1987,1) 100-119. In general cf. Pellegrin (1986,1) 133-158.

⁴²⁷ Cf. Lennox (1987,1) and Gotthelf (1988): the *HA* is concerned to identify the groups of creatures which share particular common attributes, as a basis for the task of explanation as carried on in the other zoological treatises such as *PA* and *GA*.

This is the conclusion of Michael's commentary on the *Parva Naturalia*, written in the first half of the twelfth century A.D. He does not appear to present "concerning plants" and "concerning flavours" as book titles. In the case of the latter the reference is by this date probably, as Regenbogen says, to *CP* 6. See above, on **384** lg and **385**.

391 Manuel Philes, *Poems* 107, dedication (vol. 2 p. 150.19 Miller)

M. Treu, *Maximi monachi Planudis epistulae* (Breslau: Koebner, 1890, repr. Amsterdam: Hakkert, 1960) 200. K. Krumbacher, A. Ehrhard, H. Gelzer, *Geschichte der byzantinischen Litteratur*² (Munich: Beck, 1897), 778 (*Handbuch der klassischen Altertumswissenschaft* 9.1).

The poem that follows accompanied Philes' sending to Bardales of a copy of *HP*; Philes asks in return for a copy of Alexander of Aphrodisias, perhaps, as Miller 151n. suggests, of the *Quaestiones*. For Philes' interest in natural science see also **375**. Philes lived approx. 1275-1345 A.D.; Bardales is probably to be identified with the Leo Bardales who was Protosecretarius in 1321.

PARTICULAR PLANTS

392 (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 3.11 77A (*BT* vol. 1 p. 179.21-3 Kaibel)

Regenbogen (1940) 1443-4.

This passage forms part of a series of citations in Athenaeus (3.11-13 77A-78A), analysed by Regenbogen loc. cit., most but not all of which correspond to the surviving text of Theophrastus: **392**, **413** no. 34, **413** no. 38, **417** nos. 12 and 13; **393**, **413** no. 18, **417** no. 6, **394**. (Citations of Aristophanes, Antiphanes and Theopompus intervene between **417** no. 13 and **393**.) See above at nn. 388-91; and further on **393-4**.

There is no explicit reference in *HP* 2 (or anywhere else in the work or in any Greek text on the Thesaurus Linguae Graecae CD-ROM "D") to an "Aratean" fig-tree or any other "Aratean" plant. There was a shrine to Aratus at Sicyon called the *Arateion* (Plutarch, *Life of Aratus* 53; Pausanias 2.9.4), but there is no mention of a fig-tree in connection with it. The passage thus remains quite obscure. Dindorf deleted χαρίτιος, which is not the name of any plant; *charisia*

is a plant used as a love-charm at *Mirabilia* 163 846b7, but this makes no sense as a comparison for a fig-tree. Vivian Nutton notes that χαρίτιος could be a doublet arising from a deletion of a mis-spelling ἀριτιος.

393 (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 3.12 77E (*BT* vol. 1 p. 181.5-6 Kaibel)

Regenbogen (1940) 1444.

See above on **392**. The statement that the wild fig bears twice yearly is not in *HP*, but is in *CP*, at 2.9.13 (though *CP* has *agrioi* where our text has *erineon*). There seems no doubt that by *en tōi deuterōi Peri phutōn* Athenaeus intended the second book of *HP* rather than of *CP*; and the connection of this report with others in Athenaeus suggests that there is more to the matter than just a confusion between the two Theophrastean works.

Our statement is also made, without Theophrastus being named, in Pliny 16.113. That Pliny and Athenaeus are following a common source in this passage and in **394** is indicated by the presence of the same points in the two authors, but in a different order, as follows:

(a) The special species in Cilicia, Cyprus and Greece, **394**: Pliny 16.113, Athenaeus 3.13 77F.

(b) *prodromoi* figs, **417** nos 12-13: Pliny 16.114, Athenaeus 3.12 77C.

(c) The double-bearing wild fig-tree, **393**: Pliny 16.114, Athenaeus 3.12 77E.⁴²⁸

(d) Triple-bearing wild figs in Ceos: Pliny 16.114, Athenaeus 3.12 77E.

(a), (b), (c) and (d) form an unbroken sequence in Pliny, who cites no sources in the immediate context. Athenaeus cites first *CP* 5, correctly, for (b) = **417** nos. 12-13, followed by other authorities first for early figs and then for figs that bear more than once. Then he cites “Theophrastus *HP* 2” for (c) (our present text); “others” for (d); “Theophrastus” (*HP* 2.5.5 = **413** no. 18) for fig-trees planted in squills; “Theophrastus *CP* 2” (2.10.2 = **417** no. 6) for the Indian fig-tree; and “the philosopher in *CP* 2” for (a) (= **394**). The absence from

⁴²⁸ Pliny does not yet mention *wild* figs specifically, only in the next item. This causes André to interpret Pliny as still referring to cultivated figs, and to criticise him for suggesting that *some* of these bear two crops when in fact this is normal. But it may rather be that Pliny has garbled his source by not putting in a reference to wild figs in (c) as well as (d).

Pliny of some of the Theophrastean material in Athenaeus, and hence in their common source, can be explained by Pliny's specific concern here with early and multiple fruit-bearing of trees of various types, rather than with the whole range of topics relating to fig-trees specifically. See further below, on **394**.

The *erineos* is identified by Amigues (1988) 111 as *Ficus carica* L. var. *caprificus*. The wild fig or caprifig bears spring fruits on the new wood which contain the pollen the grubs convey to the cultivated fig, and fruits on the old wood, formed in the autumn, surviving over the winter and ripening in the spring, which contain the grubs used in caprification (Amigues loc. cit.).

394 (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 3.13 77F-78A (*BT* vol. 1 p. 181.15-24 Kaibel)

J.B. Gulick, *Athenaeus: the Deipnosophists*, vol. 1 (*LCL* 1927) 336 n. 1. Regenbogen (1940) 1444. Einarson-Link (1976-90) vol. 3 13 n. 3.

Whereas **393** referred to wild fig-trees that bear fruit twice in a year, **394** refers to a tree that bears both *olonthoi* and *sukai*. This passage is parallel to one in Pliny (see above on **393**), and related to but not identical with a number of passages in Theophrastus' surviving botanical works—though Theophrastus, as Regenbogen (1940) 1444 notes, discusses these topics in *CP* rather than in *HP*.

(I) In *CP* 5.1.8 Theophrastus refers to trees that bear both *suka* and black *olonthoi*,⁴²⁹ the latter being edible or inedible, containing fig-wasps, and borne behind the leaf. These are contrasted with other trees that bear white and edible *olonthoi* and no *suka*. Einarson-Link (1976-90) vol. 3 13 n. 3 rightly relates the trees that bear both *olonthoi* and *suka* to our present text, but our text is not a verbatim quotation of this Theophrastus passage.⁴³⁰

(II) Just before, in *CP* 5.1.6, Theophrastus mentions "double-bearing fig-trees", *diphoroi sukai*, identified by Einarson-Link (1976-90) vol. 3 10-11 n. 3 with the tree of 5.1.8. However, Theophrastus does not make this connection explicit, and Athenaeus (3.77D) cites Aristophanes

⁴²⁹ *olonthos* and *olonthos* are simply variant spellings.

⁴³⁰ Cf. also *HP* 5.2.3 with Einarson-Link's note (vol. 3 p. 23 n. 4, where "5.1.3" is presumably a misprint for "5.1.8").

and others for *diphoroi sukai* before coming on to double-bearing wild fig-trees in our **393** and **394**.

(III) At *CP* 2.9.13 Theophrastus refers to “wild” (*agrioi*) fig-trees that bear two crops, also identified with the tree of 5.1.8 by Einarson-Link (1976-90) vol. 3 10-11 n. 3; though they further note that there was some doubt as to whether these deserved the name of “fig-trees”, citing *HP* 3.7.3.⁴³¹

(IV) At *HP* 1.14.1 Theophrastus refers, among trees that bear fruit from both old and new wood, to *olunthoi* that concoct their fruit and bear *suka* on the new wood.⁴³² Einarson-Link (1976-90) vol. 3 10-11 n. 3 take it that the fruit are the *olunthoi* and that these too are the trees of 5.1.8.⁴³³

Kaibel ad loc., followed by Gulick, confidently states that the “philosopher” in our text indicates “not Theophrastus but the common source of Athenaeus and Pliny”. But, as Regenbogen argues, comparison with the immediately preceding context (see above, on **393**) and with Athenaeus 3.26 83d = **413** no. 42, where “the philosopher, in the fourth book of *HP*” introduces a verbatim quotation of *HP* 4.4.2 after Theophrastus has been explicitly named in the previous sentence, suggests that Athenaeus himself intends the reference to be to Theophrastus—rightly or wrongly—and uses “the philosopher” simply for elegant variation.⁴³⁴ On the other hand, while it is difficult to suppose that Athenaeus did not himself think he was citing Theophrastus in our passage, it is odd to have the fruit of a kind

⁴³¹ Here translated by Einarson-Link as “. . . and if after all some fig-trees (*sukai*) bear *olunthoi*,” but at vol. 3 12-13 n. 2 rather as “and there are some, if they are fig-trees, that bear *olunthoi*”). Amigues (1989) 19 renders “et ses figues tardives (= *olunthoi*), sur les arbres qui en produisent”; Hort vol. 1 p. 199 “and in some kinds the untimely figs”. Einarson-Link do more justice to Theophrastus’ *ei tines ara* than either Amigues or Hort. Theophrastus is here distinguishing from the true figs both the early ones that drop off (here *ērīna*, but for the use of this for *prodromoi* cf. Einarson-Link [1976-90] vol. 3 9 n. 3) and the *olunthoi* that come too late to ripen (Amigues [1989] p. 139); Hort’s “untimely” suggests “early” and so does not seem right for the *late olunthoi*.

⁴³² Schneider, on the grounds that *olunthos* is not elsewhere used of a *tree*, emended to “the *sukē* which ripens its *olunthoi* and also bears *suka*”.

⁴³³ Amigues (1988) 111 comments on this passage in terms of the ordinary sort of wild fig-tree, and takes the description to apply to wild fig-trees in general; “le caprifiquier, qui mûrit” with a comma (ibid. 40). However *CP* 1.18.4 and 2.9.13 show that not *all* wild figs concoct their fruit, and in any case the tree in question in *HP* 1.14.1 is said to bear *suka*.

⁴³⁴ Similarly at 2.34 50b-c Athenaeus, introducing a pair of verbatim quotations

of tree in *Greece*, Cilicia and Cyprus contrasted with those “among us” in a text by Theophrastus. Athenaeus may have reworked the whole quotation from his or his speaker’s point of view (the speaker here is Magnus, described by Gulick [*LCL* Athenaeus, vol. 1 xxii] as “probably a Roman”; but the whole discussion was presented as reported by Athenaeus himself to Timocrates). Or else the Theophras-tean material may finish in line 4 of **394** (where the parallel with Pliny ceases), rather than extending to line 7.

As mentioned above on **393**, the wild fig bears spring fruit on the new wood and fruit over the winter on the old wood. According to Amigues the cultivated fig-tree (*Ficus carica* L.) can bear three stages of fruit; (A) early figs, called *prodromoi*, that fall before they develop; (B) figs that ripen to full maturity, *suka*; and (C) late figs that do not have time to ripen before the end of the season. (A) and (C) are produced behind the leaf, i.e. on the old wood, (B) in front of it.⁴³⁵

Einarson-Link (1976-90) vol. 3 8-9 n. 3 distinguish *olunthoi* from *êrînon*, the fruit of the wild fig-tree (also used for the *prodromoi* and the unripe *sukon*). LSJ however recognise as meanings for *olunthos* not only (ii) “sterile summer fruit of cultivated fig”, but also (i) “edible fruit of wild fig”, under which they class our present text, and (iii) “sterile male inflorescence of the caprifig, breeding *psênes*”, fig-wasps. *Olunthos* thus seems to have associations both of wildness and of failure to ripen. “Wild” in its literal sense is not the appropriate term in our present passage, since we are dealing with two types of fruit on the same tree, but it may serve with the addition of “scare-quotes”. In any case the difference between the type of tree dealt with in **394** (and in *CP* 5.1.8) and the normal fig-tree is not so much that it bears both *suka* and something called *olunthoi*, as that its *olunthoi*, unlike those of the normal fig-tree, are “ripe and sweet”.

from *HP* (**413** nos. 29 and 32), mentions Theophrastus by name, but in drawing conclusions from the second refers to “the philosopher”. At 8.2 331c “this same philosopher” picks up a reference to Theophrastus by name and introduces a paraphrase of *On Fish* 8 (= **363** no. 4). In both these passages the information in Athenaeus also appears in Pliny, but the second passage has nothing to do with plants, and even if Athenaeus is nevertheless using an intermediate source also used by Pliny, that does not alter the fact that “the philosopher” is being used for Theophrastus for the sake of variation, whether by the intermediate source or by Athenaeus himself. Athenaeus’ source may have been an interpolated version of Theophrastus containing extraneous material, but that is a different issue. Cf. also Apollonius 34 (**413** no. 93, below).

⁴³⁵ Theophrastus *CP* 5.1.7 and 5.1.9; Amigues (1988) 111. Cf. Einarson-Link (1976-90) vol. 3 8-9 n. 3, suggesting that *prodromos* was short for *prodromos olunthos*.

If we retain the MSS *hai de holôs* in line 4, the sense could be either (A) "Others in general produce from last year's shoot and not from the new one",⁴³⁶ or (B) "and some bear the *olunthoi* all from last year's shoot and not this year's".⁴³⁷ (B) gives a better sense, for *suka*, as opposed to *olunthoi*, are not generally produced on last year's wood. But to say that the *olunthos* is behind the (new) leaf and that it is on the old wood amount to the same thing,⁴³⁸ so that with (B) the apparent contrast in *hai de* is awkward. It therefore seems preferable to accept Wilamowitz' emendation, 'The "wild" fig (grows) from last year's shoot . . .', line 4 being explanatory of what precedes it.⁴³⁹

395 (inaccurate report of extant Theophrastean work?) Pseudo-Julian, *Letters* 24 (to Sarapion) 391-392A (p. 231.2-12 Bidez-Cumont)

Usener (1858) 21. Rose (1863) pp. 232-3 no. 16 (209). "Aristotle" fr. 276 Rose³. J. Bidez and F. Cumont, *Iuliani Epistolae*, etc., Paris: Les Belles Lettres, 1922, 228. W.C. Wright, *The works of the Emperor Julian*, vol. 3 (LCL 1923) p. 271.

The text of this letter, attributed to Julian the Apostate (emperor of Rome 360-3 A.D.) but not by him, is included in Bidez-Cumont's Paris 1922 edition, published under the auspices of the Association Budé but including only the Greek text and no French translation.⁴⁴⁰ This edition formed the foundation for the actual *CB* Julian volume 1.2, "Letters", of 1924, but the latter does not include all the material in the former, and not the present text. Bidez-Cumont suggest that the letters wrongly assigned to Julian the emperor may be by the orator Julian of Caesarea, who was a pupil of Iamblichus and courtier of Constantine.⁴⁴¹ The letter accompanied a gift to Serapion of a hundred figs, and comprises encomia first of figs and then of the number one hundred.

⁴³⁶ So, in effect, the Loeb of Athenaeus: "other trees there are also, which in general produce from the last year's growth".

⁴³⁷ So Einarson-Link (1976-90) vol. 3 13 n. 3.

⁴³⁸ Cf. Einarson-Link (1976-90) vol. 3 8 n. 2.

⁴³⁹ In the subsequent sentence the Loeb of Athenaeus translates "And this fig is the first to have ripe, sweet fruit, unlike the runty kinds among us"; but Einarson-Link's "They bear the *olunthos* before they do the figs, and it is ripe and sweet and not like the *olunthos* of our country", taking *prôton* in the sense of *proteron*, gives a better sense.

⁴⁴⁰ The letter is 24 in the standard numbering (Hertlein's), but *text* 180 in the Bidez-Cumont volume, for the spurious letters are there placed at the end.

⁴⁴¹ Julianus (5) in *PRLE* 1.469.

Pseudo-Julian says that many plants can be grafted onto the fig-tree; Theophrastus *HP* 2.5.6, cited by Wright, rather that the fig-tree can be grafted onto many plants. The phrase in pseudo-Julian's "receptive of different sorts of generation" is, arguably, ambiguous; one might wonder whether there is a clue here to misunderstanding at some stage in the transmission.⁴⁴²

What [Julian] says in our passage also appears in a section of the *Geoponica* which is attributed to Diophanes, without Theophrastus being named and with reference to the *erineon*, the wild fig, rather than the *sukê*; "Quinces and the wild fig are receptive of every tree, so graft or insert into these what you will."⁴⁴³ There are links between the antecedents of the *Geoponica* and the literary culture of the time of Julian which may suggest that this *may* not be just coincidence. The preface to book 1 of the *Geoponica* cites in sequence "Vindanionus and Anatolius and Berytius";⁴⁴⁴ Photius, *Library* 163, excerpts a writer on agriculture named Vindanius Anatolius Berytus (*sic*; for "from Beirut" one would expect *Bêrutios*, as Vivian Nutton points out to me.⁴⁴⁵ It is probable that these are references to the same individual,⁴⁴⁶ and an identification has been suggested with a pagan Anatolius who was prefect of Illyria in 357-60 A.D.⁴⁴⁷ Wellmann (*loc. cit.*) describes Anatolius as the source for the material from Diophanes in the *Geoponica*. Whether or not the passage in question actually comes from Diophanes, it does not seem impossible that there is a connection between the *Geoponica* passage and ours in pseudo-Julian. It seems necessary however to suppose a common source, neither Anatolius nor pseudo-Julian being the direct source of the other. For, apart from the fact that Anatolius is too late to be the source for Julianus of Caesarea—if the identification of this Julianus as the author of our passage is correct—the *Geoponica* passage does not mention Theophrastus and there is no ambiguity in its formulation; conversely,

⁴⁴² Grafting rue into fig-trees is mentioned at *CP* 5.6.10 and [Aristotle] *Problems* 20.18 925a35.

⁴⁴³ *Geoponica* 10.76.8, τὰ κυδωνία καὶ τὸ ἐρίνεον παντὸς δένδρου ἐστί δεκτικά, ὃ βούλει οὖν εἰς ταῦτα ἐγκεντρίσων ἥτοι ἐμφυλλίσων. Diophanes, a writer of the time of Cicero (cf. M. Wellmann, 'Diophanes (9)', *RE* 5.1 [1903] 1049), is cited as the source for the whole chapter (313.17), but such attributions in the *Geoponica* are unreliable; see above on 383.

⁴⁴⁴ *BT* p. 3.9 Beekh.

⁴⁴⁵ *CB* vol. 2 p. 134.41 Henry.

⁴⁴⁶ Vivian Nutton suggests the original might have had Οὐινδάνιος ὁ καὶ Ἀνατόλιος Βηρύτιος, "Vindanius, the one also called Anatolius Berytius"; hence the confusion.

⁴⁴⁷ Anatolius (1) in *RE* 1.2 (1894) 2071; (3) in *PRLE* 1.59-60. Cf. Rose (1863)

pseudo-Julian is unlikely to be the source for Anatolius, for Anatolius, in addition to using a different word for the fig, mentions quinces as well.⁴⁴⁸ It is in any case likely that a rhetorical writer would draw on and elaborate technical literature rather than the other way round.

Usener argues that “Advice on Farming” in our text is doubtful as evidence for a Theophrastean book-title, the material probably having come from “a fuller version than *CP* 3” (meaning, presumably, a version of *CP* fuller than ours); but if our text is in fact a misunderstanding even this supposition seems unnecessary. See also **396**.⁴⁴⁹

- 396** (dubious report concerning Theophrastus) Geoponica = Cassianus Basus, *Selections on Farming* 3.4.2 (p. 91.6-9 Beckh)

Gemoll (1884) 39. Oder (1890) 65.

For the *Geoponica* see above on **383**. The information in this text does not appear in *HP* or *CP*. Oder suggested that it might come from the *Advice on Farming* suggested as a Theophrastean title by **395**; but see above on that text. Planting in spring is recommended generally by Theophrastus in *CP* 3.3; propagation of the pomegranate, olive and myrtle from cuttings of various types at *HP* 2.1.3-4 and 2.5.5, and the proper way of planting pomegranate and myrtle at *HP* 2.5.6—the latter two passages being separated only by the reference to the fig-tree that may be the misunderstood source of **395** (q.v.). Planting pomegranates with pegs is mentioned at *HP* 2.5.5 and *CP* 3.12.1, but there the “peg” is one driven into the ground to make a hole for the planting; Theophrastus nowhere uses *pattalos* (= *passalos*) for the cutting itself. Androtion is cited for olive, myrtle and pomegranate requiring strong manure and much watering at *HP* 2.7.3 (see below on **417** no. 9); Gemoll notes that this is the only place in the extant works of Theophrastus where these three plants are mentioned together in a single list.

- 397** (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 3.24 82E-F (*BT* vol. 1 p. 191.23-192.2 Kaibel)

Schweighäuser (1801-7) vol. 2 55. C.B. Gulick, *Athenaeus* vol. 1 (*LCL* 1927), p. 356-7 n.(a).

268-270; Gemoll (1884) 222; Oder (1890) 66-7, 98; M. Wellmann, ‘Anatolius (14)’, *RE* 1 (1894) 2073; Christ-Schmid-Stählin (1920) 292.

⁴⁴⁸ There appears to be no parallel in Theophrastus to this reference to the quince.

⁴⁴⁹ Cf. Oder (1890) 76. A work *On Farming* was attributed to Aristotle in the third

This is presented by Athenaeus as a verbatim quotation (*tade*) from *HP* 2, but is not in fact found there. *Persikou* could be “the Persian nut”, i.e. the “walnut”, or “the Persian (fruit)”, i.e. the peach. Schweighäuser, citing de Saumaise, argues for the former on the basis of the arrangement of the examples in the passage. The walnut (*Juglans regia* L.) is indeed less obvious in the early stages of its growth than the other nuts mentioned because the shell is encased in a soft outer covering. The peach (*Prunus persica* [L.] Batsch) is close to the almond (*Prunus dulcis* [Miller] D. Webb) in terms of the general botanical relationships of the *tree*, but our text’s particular concern is with the growth of the fruit.⁴⁵⁰ There is evident confusion in the sequel in Athenaeus, where, as Gulick points out, the material from Diphilus relates to peaches but that from Phylotimus in part to walnut-oil.⁴⁵¹

- 398** (inaccurate report of extant Theophrastean work) Plutarch, *Table-Talk* 5.8.2 683D (*BT* vol. 4 p. 175.18-22 Hubert)

Teodorsson (1989-90) vol. 2 216.

The statement that the pomegranate (*Punica granatum* L.) *alone* ripens its fruit more swiftly in the shade is not found in Theophrastus’ extant works, as Teodorsson notes; but at *CP* 2.7.3-4 Theophrastus includes pomegranate and myrtle (*Myrtus communis* L.) among trees that like shade, and says that in *both* cases the fruit, being stony⁴⁵² and having little moisture, ripens better in the shade. (Cf. also *CP* 3.7.1-2). Plutarch is probably recalling this passage, and speaks only of the pomegranate because he is concerned in the context with autumn fruit that is eaten.

- 399** (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 2.59 61E (*CB* vol. 1 p. 151.18-23 Desrousseaux)

“Aristotle” fr. 273 Rose³. Steier, art. ‘Pilze’, *RE* 20.2 (1950) 1372-86, at 1380. Regenbogen (1940) 1444-5. Maggiulli (1977) 117-124. Sharples-Minter (1983). Amigues (1988) 84 n. 12.

section of the anonymous catalogue of his works and in Ptolemy’s index (Rose [1863] 268; Moraux [1951] 266, cf. 281-2, dismissing it as spurious).

⁴⁵⁰ Theophrastus at *HP* 4.4.2 says that the *leaves* of the peach are like those of the walnut.

⁴⁵¹ I am grateful to Andrew Dalby for bringing the whole problem to my attention and to Pat Easterling for further discussion; neither is to be held responsible for the use I have made of their information here.

⁴⁵² Einarson-Link render “has a large stone”, but this hardly seems appropriate

This is the first of a sequence of alleged citations from Theophrastus in Athenaeus, followed by **413** nos.44, 5 and 6, and by **400**; while the first and fifth quotations are not found in our texts of Theophrastus at all, the others correspond to passages in *HP* but exhibit significant variations. A citation of Phantias intervenes between **413** no. 44 and **413** no. 5. See above on **393**.

That the *mukês* (a general term for fungi, here rendered “mushrooms” on the basis of the contrast between fungi with stalks and those without) and truffle have no roots is claimed at *HP* 1.1.11; at 1.6.5 puff-balls are added to the list (if that is the correct rendering of *pezis*; but see on **413** no. 5). Plutarch *Table Talk* 4.2 664F says that the truffle has no root or shoot (is *arrhizon* and *ablastes*), and Pliny 19.38 that *pezicae* are without root or stalk. Neither Plutarch nor Pliny mentions Theophrastus in these passages. In the present text too both *pezis* (or *pezix*; Amigues, taking *pezikas* as a third declension accusative plural) and *mukês* seem to be described as rootless, the point about the *mukês* being that, although it has a stalk, this is its “first point of attachment”, not growing from any roots. In fact the obviously visible part of fungi is simply the fruiting body, fed by the mycelia. The original reference of “such (plants)” in Athenaeus’ source is now lost.⁴⁵³ Maggiulli 119-20 rightly argues, against Steier, that Theophrastus is not being reported as saying that the *pezikai* themselves grow partly above and partly below ground. “Roofs” is a metaphor for what would now be called canopies.

On the form of the title of Theophrastus’ work here see above on **384** no. 1a. The spelling *arizoi* (rather than *arrhizoi*) in line 3 is that of all the modern editions.

- 400A** (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 2.60 62A-C (*CB* vol. 1 p. 152.9-10, 152.11-153.3 Desrousseaux)
- 400B** (dubious report concerning Theophrastus) Apollonius, *Amazing Stories* 47 (*Parad. Gr.* p. 140.258-9 Giannini)

“Aristotle” fr. 272 Rose³. Regenbogen (1940) 1444-5. Steier, art. ‘Pilze’, *RE* 20.2 (1950) 1372-86, at 1381-3. Capelle (1955) 171. Maggiulli (1977) 135-7. Sharples-Minter (1983). Amigues (1988) 84-7.

for the pomegranate with its many seeds. At 3.7.1 (below) they render the same word *purênôdês* by “with plenty of stone”.

⁴⁵³ In Athenaeus himself what has preceded is a quotation from Diphilus concerning poisonous mushrooms.

400A is the last of a series of five citations by Athenaeus of Theophrastus on fungi—see above, on **399**—but does not appear in our texts of *HP*. However, the content of the whole passage with the exception of the initial, theoretical point about the instantaneous generation of truffles (see further below) also occurs in Pliny 19.36-7. Theophrastus is not named by Pliny here, but there is other Theophrasteian material in the context (cf. 19.38 with **399** above; and Theophrastus is named at 19.32 = **408**). Regenbogen emphasises the Theophrasteian language of our present passage and the local knowledge of Mytilene that it displays.

Regenbogen suggests that the common source of Athenaeus and Pliny here may have been Pamphilus (cf. above at n. 390), and that this source incorporated, along with material from *HP*, material from a discussion by Theophrastus of spontaneously generated plants⁴⁵⁴ which was a companion work to **350** no. 5c (q.v.) or formed part of it.⁴⁵⁵ For Apollonius see above on **350-383**, Sources.

The text sets out arguments for two theories concerning the origin of truffles. First it is claimed (apparently) that they are created instantaneously in the earth. Pliny 19.35 (not referring to Theophrastus by name, but see above) does not refer to *instantaneous* generation, but says that truffles are formed from the earth, and cites as evidence an anecdote of Larcus Licinius, *propraetor* in Hispania *Tarracensis* who died in about 70 A.D.⁴⁵⁶, who bit on a coin inside a truffle. Lines 4-7 of our text seem to be an allusion to the belief that truffles are produced in the ground by lightning⁴⁵⁷, as in Pliny 19.37. For “they come to be when there are autumn rains and harsh thunder”, Schneider’s emendation gives rather “they come to be bitter”, or “harder”, “when there are autumn rains and thunder”, as in **400B**; but Pliny’s text suggests that he took *sklērai* with “thunder”. **400B** applies the remarks about thunder to truffles (*hudna*) in general, as does Pliny; in **400A** line 5 *toutôn* could refer just to the *iton* but more probably refers to the whole group, *hudnon*, *misu* and *iton*.

⁴⁵⁴ Comparing *CP* 1.5.1 and *HP* 3.1.6. See above, on **383**.

⁴⁵⁵ In support of this view Regenbogen notes that in the MSS **400B** refers to *tois peri phutôn* rather than *tôi*.

⁴⁵⁶ J. André, *Pline l'ancien* vol. 19 (*CB* 1964) p. 110; cf. Pliny, 31.24, and G. Serbat, *Pline l'ancien* vol. 31 (*CB* 1972) p. 121. That this is not botanically unlikely is argued by Maggiulli (1977) 140, who suggests that the “truffle” was *Terfezia leonis* Tul. (below).

⁴⁵⁷ For which cf. also Plutarch *Table Talk* 4.2 664F, with Teodorsson (1989-90) vol. 2 47, and Juvenal 5.117, cited by Amigues.

Others, however (8ff.) say that truffles come from seed. For seeds brought by rain from elsewhere as an alternative explanation for spontaneous generation in Theophrastus cf. *HP* 3.1.5, *CP* 1.5.2, 5.4.6, and *On Fish* 11; Capelle (1955) 161, 169-70; Balme (1962) 102 and n. 3, and above on **383**. Capelle (1955) 171 argues that our present passage is not evidence for scepticism about spontaneous generation on Theophrastus' part; see above on **383**, ad fin.

hudnon is probably a generic name for truffles; see on **413** no. 5. In modern terminology *Tuber* is the name for true truffles, and *Terfezia* for a paler type of truffle found in Greece and the Near East (Amigues [1988] 85). Amigues (ibid.) identifies the *misu* with "*Terfezia leonis* Tul. and neighbouring species"; the source of **400A** is probably not itself being any more precise than that.⁴⁵⁸

The Thracian *iton* or *iston* is called *itum* by Pliny 19.36. Kaibel's emendation to *oiton* in **400A** rests on Hesychius' identification of *oiton* and *ouiton* (Hesychius s.v. *ouiton*, vol. 2 p. 789 Latte), together with *ouiton* as the name of an underground fungus in *HP* 1.6.9 (= **413** no. 6; see the Commentary there), but uniformity of spelling is not perhaps to be expected. Pliny adds the *geranion* or *ceraunion* to the list here; see on **413** no. 6.

401 (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 14.64 651AB (*BT* vol. 3 p. 44.9-14 Kaibel)

Amigues (1989) 275.

The greater part of what is attributed to Theophrastus here corresponds to *HP* 4.10.3, and is indeed cited by Athenaeus as from *HP* 4; but the final clause, from "saying also that", relating to a type of *sidê* in the Nile, is not in our texts of Theophrastus, though attributed to him also by Hesychius. Amigues suggests that an original reference to the lotus (see below) was subsequently removed as inexact. It is not entirely clear whether she is suggesting that there were an earlier and a later recension by Theophrastus himself, Athenaeus or his source having gained access to the earlier and fuller version while our transmitted text of the *HP* itself reflects the later,

⁴⁵⁸ In the *Guardian* of 8th November 1990 it was reported that "sand-truffles" from North Africa had been imported to France and dyed black to pass them off as genuine truffles; restaurant owners said that customers were very satisfied with the quality, which bears out our text's "this is held to be very pleasant to eat". On *Terfezia* see also Maggiulli (1977) 139-40.

or whether the suggestion is that the reference was expunged from the text of Theophrastus much later, after Athenaeus or his source consulted it—which would leave open the question whether the extra reference was due to Theophrastus himself in the first place; and indeed at (1988) xxx n. 65 Amigues includes this passage among those whose attribution to Theophrastus himself is doubtful. It may simply be that Athenaeus was using, not the original text of *HP*, but an interpolated text or a compilation.

The *sidē* in Lake Copais near Orchomenus in Boeotia is *Nymphaea alba* L., named from the comparison between its fruit and that of the pomegranate (also called *sidē*, though not by Theophrastus who prefers *rho(i)a*). Amigues suggests that the Egyptian *sidē* referred to here is the lotus, *Nymphaea lotus* L., discussed in its own right under the name *lōtos* at *HP* 4.8.9.

- 402** (dubious report concerning Theophrastus) Pollux, *Nomenclature* 10.170 (*Lexicographi Graeci* vol. 9.2 p. 240.30-1 Bethe)

Rose (1863) p. 266 no. 3 (248). Aristotle fr. 268 Rose³.

Pollux, who compiled his *Nomenclature* (*Onomasticon*) or thesaurus of terms on various topics in the second century A.D., cites as from *Plant* (*Matters*) “by Aristotle or Theophrastus” a list of plants which does not occur either in Theophrastus *HP* or in our text of [Aristotle] *On plants*. For uncertainty over whether a work was to be attributed to Aristotle or to Theophrastus cf. also Pollux, *Nomenclature* 7.99 (**198**, in apparatus) and above on **197**. Rose suggests that this might in origin be a list of plants that burn easily but smokily; cf. the discussion of woods that burn smokily at *HP* 5.9.4.

- 403** (inaccurate report of extant Theophrastean work) [Alexander of Aphrodisias], *On Aristotle's On Sophistical Refutations* 4 166b4-6 (*CAG* vol. 2.3 p. 33.29-34.2 Wallies)

The commentary on Aristotle's *Sophistical Refutations* attributed to Alexander of Aphrodisias (c.200 A.D.) is in fact the later of two versions compiled in the twelfth century A.D. by Michael of Ephesus, for whom see above on **390**. Cf. S. Ebbesen, *Commentators and Commentaries on Aristotle's Sophistici Elenchi*, Leiden: Brill, 1981 (*Corpus Latinum Commentariorum in Aristotelem Graecorum*, 7) vol. 1 268-329. Here Michael is commenting on an Aristotelian discussion which takes as

its starting-point the reference at Homer, *Iliad* 23.327-8, to a dead tree-stump, "either an oak or a pine", that has not been rotted.⁴⁵⁹ In this connection he cites Theophrastus as saying that the pine-tree is not rotted by fresh water but is by sea-water. Theophrastus however says at *HP* 5.4.3 that the *oak*, unlike other woods, is rotted by sea-water, and says this with reference to the timber rather than to the tree as in the Homeric passage. He does shortly afterwards refer to the pine being eaten by the ship-worm, and this may explain [Alexander]'s mistake. See further below, on **413** no. 53. Amigues (1993) 75 suggests that the statement that oak rots in sea-water—contrary to modern experience—may be explained by the inferior quality of the timber used, and cites archaeological evidence suggesting that oak was indeed in antiquity used for parts of vessels that were less exposed to water or more easily replaced. Theophrastus does not say explicitly that *fresh* water does not have the same effect; rather, he first says that the oak does not rot if soaked in water, then that it is for this reason used for boats on rivers and lakes, and then that oak rots in sea-water while other woods are preserved by it.

Hort translates *peukê* generally by "fir", but Amigues by *pin*. These are in any case genera with many species; Hort gives *Pinus* as the technical name for *peukê*, and uses "pine" for some of the species that come under it. Many of them are Mediterranean trees with no established English nomenclature. It seems more appropriate to translate *peukê* by "pine" and retain "fir" for *elatê* (= *Abies cephalonica* Loudon; Hort's "silver-fir", but actually "Greek fir" whereas "silver fir" is *Abies alba* Miller; cf. Polunin (1980) 202. Below, **413** no. 14). *pitus* generally means the Aleppo pine, *Pinus halepensis* Miller. Cf. *HP* 3.9.5.

404 (corrupt report of extant Theophrastean work) Hesychius, *Lexicon*, on *Dios anthos* (no. 1919, vol. 1 p. 462 Latte)

Amigues (1993) 120.

For Hesychius see above on **349**. The transmitted text of his work has "The followers of Theophrastus say that the carnation is not a

⁴⁵⁹ This is presented by Aristotle, however, only as the solution of "some people" to the oddity of the alternative reading that takes *hou* as genitive singular: "part of it" is rotted. The solution of reading *ou*, "that has not been rotted", was in fact that of Hippias of Thasos (Aristotle *Poetics* 25 1461a21-22; cf. D.W. Lucas, *Aristotle's Poetics*, Oxford: Clarendon Press, 1968, 243. So too [Alexander], though he erroneously cites Aristotle's *Rhetoric* rather than the *Poetics* for Hippias' name).

pot-herb, but a carnation”; however the Suda, which does not name Theophrastus, has rather “. . . but a spiny plant (*akanthôdes*)”, and Musurus corrected the text accordingly. Photius just has “*Dios anthos*: a spiny plant.” In *HP* Theophrastus includes *Dios anthos* in a list of undershrubs cultivated for garlands (*stephanôtika*) (6.1.1), and then deals with pot-herbs as another class of undershrubs (6.1.2). Spiny plants are then mentioned at 6.1.3, but *Dios anthos* is not named among them. Amigues’ suggestion that the report in Hesychius originated in an over-hasty reading of the Theophrastean text seems convincing.

405A (inaccurate report of extant Theophrastean work) Scholion on Nicander, *Remedies* 329 (c, p. 145.15 Crugnola)

405B (inaccurate report of extant Theophrastean work) Scholion on Nicander, *Remedies* 645 (a, p. 240.17-18 and 241.1-3 Crugnola)

Amigues (1993) 123.

Nicander wrote mainly didactic poetry, much of it on topics from natural history, probably in the second century B.C.; *Remedies* is concerned with cures for the bites of snakes and other creatures. **405A** states that Theophrastus speaks of *akanthos* (*Acanthus spinosus* L.) in the masculine gender, and **405B** that he mentions it in *HP*. Theophrastus does use the feminine *akantha* = “thorn” for various plants, and *akanos* at *HP* 6.1.3 for the plant identified by Amigues (1988) 102 as *Picnomanacoma* (L.) Cass. But he does not use the word *akanthos* in the masculine; so the report in **405A** is simply due to a misreading of *akanos* in *HP* 6.1.3 (so Amigues [1993] 123), and that in **405B** at best inaccurately expressed. **405B** is a comment on a recipe by Nicander for a remedy against vipers, scorpions and spiders. For eryngo see also above on **362H**.

406 (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 9.11 371A (*BT* vol. 2 p. 310.14-19 Kaibel)

Schweighäuser (1801-7) vol. 5 30. C.B. Gulick, *Athenaeus*, vol. 4 (*LCL* 1930) p. 181 n.(c). J.M. Edmonds, *The Fragments of Attic Comedy* vol. 3a (Leiden: Brill, 1961) 118-19.

The distinction between white and black beet (*Beta vulgaris* L.) is in Theophrastus *HP* 7.4.4, but not that—here introduced by “he says”—between the *seutlis* and the *teutlon*. Our text starts a new chapter, and

the reference of “he says” is not naturally taken as being to anyone other than Theophrastus; Gulick however understands it to be “not Theophrastus, but some grammarian who objected to the use of *seutlis* for *teutlon*.” (Schweighäuser, observing that this report did not correspond to the surviving works of Theophrastus, proposed reading *phasin* “they say” for *phêsin* “he says” in our line 3.) The variation between initial *s*- and initial *t*- in the word is a matter of dialect, *s*- being the Ionic form. It is uncertain whether this or the distinction between the ending in *-on* or *-is* (*seutlon* also being found) was the point in the original comic context in Diphilus.

- 407** (dubious report concerning Theophrastus) Athenaeus, *The Sophists at Dinner* 9.12 371C (*BT* vol. 2 p. 311.20 Kaibel)

A.C. Andrews, ‘The carrot as a food in the classical era’, *Classical Philology* 44 (1949) 182-196.

The word *staphulinos* used by Athenaeus here for “carrot” does not in fact appear in Theophrastus’ extant works (Andrews 194). *daukos*, which occurs in medical contexts at *HP* 9.15.5 (on Arcadia) and 9.15.8 and 9.20.2 (on Achaea, with the information that the plant has a black root) is translated “carrot” by Hort in the first passage, (though as he points out the text there is corrupt in any case), but left untranslated in the latter two. Conversely, *daukos* does not appear anywhere in Athenaeus. Andrews 185 shows that *daukos* is the generic ancient term for carrot-like plants, usually applied to the wild forms and used in medical contexts; he argues that the *daukos* of *HP* 9.15.5 is probably a wild carrot, and that that of 9.15.8 and 9.20.2 may be a wild black Afghan carrot.⁴⁶⁰ *Staphulinos*, the term for the cultivated carrot (though probably still a white one; Andrews 194ff.) first appears in Diocles of Carystus, cited by Athenaeus 371D (Andrews 185). Athenaeus’ report is doubly inaccurate as far as the preserved text of Theophrastus is concerned, for not only does Theophrastus not use the word *staphulinos*, he does not refer to cultivated carrots either. Perhaps Athenaeus is again using an interpolated text of Theophrastus; perhaps he simply made a mistake. We do not have sufficient evidence to tell.

⁴⁶⁰ Rather than *Malabaila aurea* Boiss. (so Thiselton-Dyer in Hort’s index, and Scarborough [1978] 382 n. 159). Our orange carrots (*Daucus carota sativus* L.) are hybrids of the black Afghan carrot and the white Mediterranean wild carrot, *Daucus carota carota*.

408 Pliny, *Natural History* 19.32 (CB vol. 19 p. 35.6-17 André)

Thorndike (1924) 73-5. Regenbogen (1940) 1441, 1453. Strömberg (1937) 119. J. André (1955) 307-8. Id., *Plinie l'ancien* vol. 19 (CB, 1964) p. 109. Amigues (1988) xviii-xx, 81 n. 3. Negbi (1989) 28-9.

The first part of this text is a generally accurate report of Theophrastus' remarks at *HP* 7.13.8 (= **413** no. 84), though Pliny's *ripas amnium* (river-banks) replaces Theophrastus' *aigialois* (sea-shores), and is incorrect if *Pancratium maritimum* L. is meant (see below). Pliny then criticises Theophrastus for not giving more detail,⁴⁶¹ and this prompts him to add that Theophrastus does not mention *spartum*, inferring from this that it was not yet in use in Theophrastus' time. Pliny's *spartum* is esparto grass proper, *Stipa tenacissima* L. or *Lygeum spartum* L.⁴⁶² Theophrastus does at *HP* 1.5.2 refer to *linosparton*, but this is identified by Hort as *Spartium iunceum* L., Spanish broom.⁴⁶³ Pliny's report is therefore an accurate report of a Theophrastean omission.

Hort (1916-26) vol. 2 p. 444 relates the first part of our text to sea daffodil, *Pancratium maritimum* L., but Negbi 28-9 expresses doubt because this is not recorded as wool-bearing. André (CB, 1964) says that the plant cannot be identified, and suggests that Theophrastus' informants may have confused coconut fibre and cotton. Theophrastus in *HP* 7.13.8 however distinguishes between the "wool-bearing" type of bulb and the "hairy Indian type".

This is one of a number of passages in which Pliny gives a precise date for Theophrastus' writing. At 3.57 = **599**⁴⁶⁴ he gives the date both in Athenian style, as the archonship of Nicodorus, and in Roman style as the 440th year after the traditional foundation-date of Rome in 753 B.C., i.e. 314 B.C. The Roman date of 440 years after the foundation of the city is repeated by Pliny 13.101 (= **413** no. 52)

⁴⁶¹ André (1955) 307-8 interprets the reference to several copies as implying that Pliny, suspecting that his original copy was defective, checked others.

⁴⁶² Cf. Morton (1986). Pliny at 19.26 mentions its use being introduced only after the first Carthaginian expedition to Spain, i.e. after 237 B.C.; and there do indeed seem to be no references to it before the Roman period.

⁴⁶³ Pliny 26.45 speculates that Spanish broom is what the Greeks meant by *sparton*, rightly according to J. André, *Plinie l'ancien* vol. 24, CB 1972, 116 ad loc.; cf. also Morton (1986), though Strömberg (1937) 119 rejects this identification, on the grounds that Spanish broom does not have many layers in its stem, as Theophrastus says of *linosparton* at *HP* 1.5.2. Theodore of Gaza seems to have had a variant reading "of flax (*linos*) and of *spartos*"; Hort (1916-26) vol. 1 p. 35 n. 6.

⁴⁶⁴ Cf. the Commentary on this text, and Mirhady (1992) 110-11.

and 15.1 (= **413** no. 59), in the latter place with “approximately” (*circa*) added. In our present text Pliny instead gives the date as 390 years before his own time. This would mean that Pliny himself was writing 830 years after the foundation of Rome, i.e. in 77 A.D. (so André 1964).

None of the Pliny passages explicitly identifies the Theophrastean work in question as the *HP*, but the citations, including the present one, can be identified in it. Nevertheless Thorndike (1924) 73-4 and Regenbogen (1940) 1453 argue that Pliny’s date is based on the reference to the archonship of Nicodorus in *CP* 1.19.5, and so is only a *terminus post quem* for the *CP*; and Amigues (1988) xviii-xx, noting that it is in principle inappropriate to give a single exact date to a course of lectures that developed over time, lists a series of references in *HP* to later events. The activities of Demetrius Poliorcetes in 307-6 are referred to at *HP* 5.2.4, 5.8.2; Antigonus is mentioned in the past tense at *HP* 4.8.4 in a way that *may* suggest that the passage was written after his death in 301. See also Jaeger (1938) 183).

Regenbogen notes, against Sprengel, that the present passage shows that Pliny at least on occasion consulted Theophrastus directly, not through an intermediary, though arguing (1441-2) that he also sometimes used intermediate sources.

See also on **413** no. 84.

409 Photius, *Lexicon*, on *dendalides* (no. 181, vol. 1 p. 388.4-7 Theodoridis)

K. Tsantsanoglou, *New Fragments of Greek Literature from the Lexicon of Photius*, Athens: Academy of Athens, 1984, 43.

This citation comes from the first volume of the edition of the complete version of Photius’ *Lexicon* from a MS discovered in 1959; previously the work had only been known in incomplete form. See above on **339**.

Theophrastus discusses barley in *HP* 8.4.2, but does not mention the word *dendalides* here or anywhere in the extant texts. Hesychius gives all of our text except “Theophrastus . . . barleycorns”; the *Lexeis Rhetoricas* and *Etymologicum Magnum* define *dendalides* as “sacred barley”, which Tsantsanoglou rightly relates to the *oulochutai* (on which cf. **730**). The original Theophrastean context of our passage may have been in a work on ritual rather than in one on botany. *ka(n)chrus* (the spellings are alternatives) can mean either parched barley or the winter-buds of trees (*HP* 3.5.5); Tsantsonoglou suggests that there may be a

connection between the last meaning and the reference to a “flower” here, presumably implying that the latter rests on some misunderstanding in the ancient transmission.

- 410** (dubious report concerning Theophrastus) Scholion on Nicander, *Remedies* 856 (b, p. 298.11-12 Crugnola)

The statement that there are two kinds of mullein (*phlomos*, *Verbascum*) does not occur in our texts of Theophrastus. The scholium goes on to attribute to Crateuas (see above on **388**) a distinction between black and white mullein, but it is not clear whether or not this is a further distinction of “female” mullein specifically into black and white types. Dioscorides *De materia medica* 4.103.1 distinguishes white mullein into “male” and “female”, and then indicates that the black is similarly divided. Pliny 25.120 identifies the “male” with the black, the “female” with the white; André⁴⁶⁵ identifies Pliny’s white mullein as *Verbascum Thapsus* L. or *Verbascum sinuatum* L., the black as *Verbascum nigrum* L. or *Verbascum lychnitis* L., but cautions against transferring this distinction to Dioscorides.

- 411A** (spurious report concerning Theophrastus) Scholium on Homer’s *Odyssey* 10.510 (vol. 1 p. 476.14-16 Dindorf)

- 411B** (inaccurate report of extant Theophrastean work) Eustathius, *Commentaries on Homer’s Odyssey* 10.510 (vol. 1 p. 391.42-4 ed. [Stallbaum], Leipzig: Weigel, 1825)

J. André, *Pline l’ancien* 16, CB 1962, 56 and 137. H. Rahner, ‘Die Weide als Symbol der Keuschheit’, *Zeitschr. für Katholische Theologie* 56 (1932) 231-253, at 252 n. 110.

411B gives two alternative explanations of the Homeric description of willows as *ôlesikarpoi*, “losing fruit” or “destroying fruit”: (A) they shed their flowers before the fruit forms, (B) drinking the juice of willow-flowers makes human beings sterile.⁴⁶⁶ (Similarly, but with different wording and not naming Theophrastus, Hesychius s.v. “*ôlesikarpoi*; the willows, because they swiftly shed their fruit, or because when the fruit is drunk it makes [people] sterile.”)⁴⁶⁷ **411A**

⁴⁶⁵ J. André, *Pline l’ancien* vol. 25, CB 1974, p. 146. 466. For the sense see further below.

⁴⁶⁷ ὠλεσίκαρποι· οἱ ἵτεται, διὰ τὸ τάχως ἀποβάλλειν τὸν καρπὸν. ἢ ὅτι πινόμενος ὁ καρπὸς

attributes only (B) to Theophrastus. Eustathius in **411B** names Theophrastus after stating both (A) and (B), the natural implication being that Theophrastus is being cited for (B), or perhaps for both (A) and (B).

Theophrastus in *HP* 9.18 discusses drugs that affect both fertility and libido both positively and negatively; but he does not refer to willow here.⁴⁶⁸ He refers to the Homeric verse in *HP* 3.1.3 (cf. also *CP* 4.4.1), but gives explanation (A) rather than (B)—the whole being reported by him at second hand with an understood “they say”. At *CP* 2.9.14 he comments that the wild fig, not bringing its fruit to perfection, might be called *ôlesikarpon* as Homer called the willow. It does look very much as if Theophrastus’ name was erroneously attached to (B) as well as (A), and then became associated with (B) only, as in **411A**. **411A** is unlikely to derive from Eustathius in **411B**, but the scholium and the comment of Eustathius (who wrote in Constantinople in the 12th century A.D.) could well reflect a common source.⁴⁶⁹

The belief that willows produce no seed or fruit might be explained by the smallness of the seeds, which were simply not noticed; Amigues (1989) 122.⁴⁷⁰ But it is also true that willow seeds are generally infertile and that the tree commonly reproduces asexually from twigs. The statement in **411A** that the sap of the willow if drunk “does away with the seed of man” could on the face of it be either a claim that it produces sterility, or a poetic way of saying that it is poisonous (“seed of man” = “human beings”). But that the former, besides being a more likely interpretation in itself, is the correct one is suggested by the existence in antiquity of a wide-spread belief that willow-sap produced sterility, a belief referred to in **411B** and in part prompted by the Homeric description of willows as *ôlesikarpoi* and the interpretation of this as “destroying fruit”. A misunderstanding of Aristotle, *GA* 1.18 726a7 may also have contributed: Aristotle

ἀγρόνους ποιεῖ. Hesychius, *Lexicon* (no. 57, vol. 4 p. 322.57-8 Schmidt [Halle, 1862, reprinted Amsterdam: Hakkert, 1965]).

⁴⁶⁸ He does in 9.18.5 mention *krataigonon*, *Polygonum persicaria* L., as producing fertility, but the fact that the English name for this is “willow-weed” is purely coincidental. Cf. Preus (1988) 88-91.

⁴⁶⁹ I am grateful to Malcolm Willcock for this information. Dindorf gives **411A** as a scholium from *Odyssey* MSS H,T and V; scholia in B,Q and V have both explanations (A) and (B), as in **411B**, but without Theophrastus’ name.

⁴⁷⁰ Theophrastus at *HP* 3.1.2 refers to the willow as *seeming* to have no fruit; and at 3.1.3 he refers to plants of which no seed, only down or a flower, is visible.

there *compares* willows and poplars, as producing no seed, with animals that fail to produce seed.⁴⁷¹ Someone might have misunderstood the Aristotle passage, in a cursory reading and given its general context, as meaning that the willow “produces no seed”, i.e. suppresses the production of seed, *in those who eat it*. An *ôlesikarpon tumpanon*, “fruit-destroying drum”, is used in the rites of the eunuch priests of Cybele at Oppian *Cynegetica* 3.283.

The belief that willow produces sterility is referred to, with quotation of *Odyssey* 10.310, by Aelian 4.23 and Democritus—perhaps pseudo-Democritus Bolus—ap. Geoponica = Cassianus Bassus, *De re rustica eclogae* 13.13.2 (*BT* p. 333.20-334.3 Beckh). *ôlesikarpos* in the sense of “producing sterility” also appears, in connection with fat, in Cercidas fr. 5 Livrea = P.Oxy. 1082 fr. 2 (vol. 8, London 1911), which has been linked with Aristotle cited above.⁴⁷² Pliny 16.110 first gives explanation (A), citing the Homeric line, but then refers to the belief that willow-seed makes women sterile as an interpretation reflecting moral decadence and an increased interest in contraception; he apparently accepts the *truth* of the belief (*constat*) but thinks Homer was above such concerns. He then returns to (A), arguing that nature did not need to give the willow fertile seed because it is easily grown from cuttings. Dioscorides, without citing Homer, twice refers to willow as inhibiting conception in the female;⁴⁷³ it is unlikely that Dioscorides would be influenced simply by the Homeric line, and so the use of willow must have been a part of medical practice. Riddle (1985) 60-1 and (1992) 32-3 discusses the possibility that willow can in fact function as a female contraceptive, citing studies of both *Salix alba* L. and *Salix babylonica* L. (cf. below, n. 475). Aëtius Amidenus refers to willow “fruit” as a remedy for spermatorrhoea (*Iatr.* 11.33.38. eds. C. Daremberg and C.E. Ruelle in *Oeuvres de Rufus d'Éphèse*, Paris: Imprimerie nationale, 1879).⁴⁷⁴

⁴⁷¹ Peck (1942) 87 actually refers to willows producing no *semen* (my italics) in order to achieve consistency in his translation.

⁴⁷² Cf. A. Platt, ‘Cercidas, fr. 2, II.12’, *Class. Quart.* 6 (1912) 43 (noting that fat is mentioned in the Aristotle passage just before the reference to willow); also E. Livrea, *Studi Cercidei (P.Oxy 1082)*, Bonn: Habelt, 1986, 136-7. (I am grateful to Giovan Battisto D’Alessio for drawing my attention to this text, and for these references.)

⁴⁷³ *De materia medica* 1.104, vol. 1 p. 96.17-18 Wellmann, of willow-leaves, and *Euporist.* 2.95, t.2 p. 299.10 Sprengel, of willow-seed. Similarly, of willow-bark in wine, Aëtius Amidenus *Iatr.* 16.17.43 and 16.17.55, ed. Zervos, Leipzig 1901. According to Isidore, *Origines* 17.7.47, the seed of the willow makes both men and women sterile.

⁴⁷⁴ Willow extract appears as a cure for spermatorrhoea in modern herbals, both

Elsewhere willow is linked not with sterility but with suppression of libido, though the two may not always be clearly distinguished. Saint Methodius of Olympia (or of Tyre, where he was bishop: c.300 A.D.), *Convivium virginum* or *De castitate* (the work is known by both titles) 4.3.99 (p. 130.17-134.5 Musurillo and Debidour: *Sources chrétiennes* 95, Paris: Les éditions du Cerf, 1963; also cited by Photius, *Bibl.* 308b33-9) treats it as a symbol of virginity for this reason. The use of the idea by Christian writers is discussed extensively by Rahner, who points out that though it gained force from the association with the instruments hung up on willow-trees by the waters of Babylon in *Psalm* 136:2 (LXX), its origin has to be traced to the familiarity of Christian writers with pagan culture.⁴⁷⁵ Apollinaris indeed used the Homeric tag in versifying the psalm (*PG* 33 1520B). Many other ancient and medieval Christian writers employ the association of willow with absence of libido.⁴⁷⁶ Confusingly but perhaps typically, it is used in two, apparently opposed ways: the willows in Babylon may symbolise the sterility of worldly concerns, but they are also used to indicate the purity of the spiritual life.⁴⁷⁷ Porphyry *on the Styx*, quoted by Stobaeus *Ecl.* 4.36.23 (vol. 5 p. 873.11-15 Wachsmuth-Hense), and perhaps itself a quotation from Plutarch (fr. 208 Sandbach) asserts that willow “fruit” in wine produces sterility (the reference here is either to males or to both males and females), suppresses seed, and reduces libido.⁴⁷⁸

In **411A** *anthrôpôn* means “human beings” and could also include women; **411B** with the masculine *piontes* must refer either to men or to both sexes. To take **411B** as referring to sterility supposes that

Western and Indian, coupled in both cases with the statement that the oil from willow leaves acts as an aphrodisiac. Grieve (1931) 846; K.M. Nadharni, *Indian Materia Medica*, 3rd ed., Bombay 1976, vol. 1 973-4.

⁴⁷⁵ Alan Griffiths suggests that the connection with sterility or absence of libido may be due to the drooping of the weeping willow. According to Mabberley 515-16 the weeping willow, *Salix x sepulcralis*, is a cross between *Salix alba* L. and *Salix babylonica* L. (the latter in spite of its name originating in China). The tree under which the Israelites wept was probably *Populus euphratica* Oliver, which is not found in the Mediterranean area (cf. Mabberley 472). Hort (1916-26) vol. 2 453 identified Theophrastus’ “white willow” as *Salix alba*; at *HP* 1.5.1 willows in general are described as “crooked and low”, but not as weeping.

⁴⁷⁶ E.g. Jerome on Zechariah 3.14, *PL* 25.1537; Rahner (1932) 249.

⁴⁷⁷ Rahner (1932) 231-253; id., *Greek Myths and Christian Mystery*, (trans. D. Battershaw), London: Burns and Oates, 1963, 308-321. Cf. also H. Musurillo, *St. Methodius, the Symposium*, Westminster, Maryland: Newman Press, 1958 (*Ancient Christian Writers*, 27) p. 206 n. 10.

⁴⁷⁸ For women as well as men producing seed see above on **376**.

“or” in ‘lose their “fruit”, or become sterile’ is explanatory rather than expressing an alternative. It might be thought that ‘lose their “fruit”’ referred rather to the procuring of abortions, but there is nothing in the parallel texts to connect willow with abortion rather than with failure to conceive. The two may not have been clearly distinguished, but that in itself weakens the case for taking “or” as expressing a true alternative.⁴⁷⁹

412 Pliny, *Natural History* 25.14 (CB vol. 25 p. 31.11-14 André)

Wellmann (1928) 41. D’A.W. Thompson (1936) 52, 56. L. Belloni and D.M. Schullian, eds., *Giovanni Tortelli Della medicina e dei medici, Gian Giacomo Bartolotti Dell’antica medicina*, Milan: Industrie Grafiche Italiane Stucchi, 1954, 6.

This report is not found in our texts of Theophrastus. It occurs, without reference to him by name, also in Aelian 1.45 (referring to a stone with which the entrance of the bird’s nest in a hollow tree has been blocked, rather than to a wedge), Dionysius, *On Bird-Catching* 1.14 (p. 11.11ff. Gorzya, *BT* 1963), Isidore 12.7.47, and Albertus Magnus, *On Animals* 23.97 (p. 1508.24-6 Stadler); also of the hoopoe, Aelian 3.26. Cf. S. Baring-Gould, *Curious Myths of the Middle Ages*, London: Rivingtons, 1872, 397.

Berchorius’ report clearly derives from Pliny (see above on **359B**). So too does a mention of this passage by Tortelli (1400-1466), in *On Medicine and Doctors* 5 (p. 6.1-3 Schullian-Belloni); this work was completed in the 1450’s and was an expanded version of the article on “Hippocrates” from an encyclopedia Tortelli had published in 1449 (Schullian-Belloni, xv). References to the effects of plants need not originally come from botanical works, as is indicated by the references to eryngo in **362A** and **362H**; the present anecdote could well derive from a discussion of animal intelligence (cf. **350** no. 11).

413 Passages in Theophrastus’ work *Research on Plants* to which later authors refer mentioning Theophrastus by name

Passages in which later authors refer to Theophrastus’ *Research on Plants* (HP) fall into three classes:

⁴⁷⁹ I am grateful to Walter Cockle, Alan Griffiths, Robert Ireland, Tony Preus and Malcolm Willcock for helpful discussion of issues relating to this text.

- (i) those that cannot be related to a specific passage in that work as it now exists;
 - (ii) those that can be so related (whether the title of the work is given, or just Theophrastus' name);
 - (iii) the intermediate category of texts that can be linked in part to extant passages in the *HP* but also attribute to Theophrastus further information that is not found there.
- (ii) can be further subdivided into:
- (ii.a) accurate reports;
 - (ii.b) inaccurate reports;
 - (ii.c) those that report the extant *HP* accurately but add further information without making it clear whether or not it is being claimed as Theophrastean.

Texts of types (i) and (iii) have already been dealt with in **392-412**; those of types (ii) and (iii) appear in the following list. Some cases of (ii.b) have also appeared in **392-412**, inclusion there depending on the extent to which they called for detailed treatment.

In what follows, accurate reports (ii.a) have generally been left without discussion, this being more appropriate to a commentary on the *HP* itself. Since the present volume is designed to be used together with our text-and-translation volume (cf. the Introduction, above) comments on passages of types (ii.b) and (ii.c) already included in the text of **413** have not generally been repeated. No attempt has been made to record here the very numerous parallels to *HP* in ancient authors not actually naming Theophrastus, even though they clearly derive from his work; for this again seems more appropriate to an edition of *HP* itself.

- 1 *HP* 1.2.1] Aelius Dionysius on *hesma*, etc.

Cf. Rose (1863) p. 267 no. 5(250); Aristotle fr. 271 Rose³.

- 2 *HP* 1.3.1] John of Alexandria, *On Hippocrates' Epidemics* 6 (6, 141a3-4 ed. C.D. Pritchett, Leiden 1975)

John (who wrote in the seventh century A.D., and whose work survives in part only in a Latin version) says that Theophrastus calls herbs, shrubs and trees "plants". For this Pritchett cites *HP* 1.3.1; the point is implied by Theophrastus' division of the subject-matter of his work there, rather than stated in so many words, and Theophrastus also distinguishes in the passage between "shrubs" (*thamnoi*) and "under-shrubs" (*phrugana*).

3 *HP* 1.4.3] Varro, *On Farming* 1.7.7

Amigues (1988) 79-80.

Theophrastus mentions palm, asphodel (*antherikos*) and squill as plants that sometimes live in the sea; Amigues explains Varro's mentioning only palms and squills by the fact that by Varro's time (1st century B.C.) *antherikos* was also a term for the squill (Aratus, *Phaenomena* 1060) and that Varro saw Theophrastus' expression as a doublet. Amigues gives examples of asphodels extending to the beach and growing in places that are submerged during storms.

4 *HP* 1.5.2] Pliny 19.32

See above on **408**.

5 *HP* 1.6.5] Athenaeus 2.59 61f.

Schweighäuser (1801-7) 415. Houghton (1885) 35, 42-6. Buller (1914-16) 53-5, 61-3. Steier, art. 'Pilze', *RE* 20.2 (1950) 1372-86, at 1380-3. Winter (1951) 66-68. Maggiulli (1977) 117-24, 130. Sharples-Minter (1983) 154. Amigues (1988) 84 n. 12. ead., 'étymologie méconnue ou réinterprétation étymologique: le cas de πύξος', in *Actes du colloque international Les phytonymes grecs et latins tenu à Nice les 14, 15 et 16 mai 1992*, Université de Nice—Sophia Antipolis, centre de recherches comparatives sur les langues de la Méditerranée ancienne, 1993 (L.A.M.A., no. 12) 9-16.

Athenaeus gives as a list of smooth-skinned plants what Theophrastus gives as a list of plants without roots; smoothness of skin has however been mentioned in *HP* 1.5.2 and of roots in 1.6.4. Athenaeus gives the list as *hudnon*, *mukês*, *pezis* and *geraneion*; the MSS of Theophrastus have as *hudnon*, *mukês*, *puxos* and *kranion*, the last two emended by a scholiast on the basis of the list in Athenaeus. Wimmer, followed by Hort, preferred *keraunion* for *geraneion*.

Hort identified *hudnon* as *Tuber cibarium* Sowerby (Hort [1916-26] 2.481) and *keraunion* as *Tuber aestivum* Vitt (ibid. 2.456), but these are in fact alternative names for a single species of truffle which (contrary to what Athenaeus imputes to Theophrastus) has a notably warty exterior.⁴⁸⁰ However, since Athenaeus' reference to smooth skin is

⁴⁸⁰ I am grateful to David Minter for the botanical information here and elsewhere in this note.

probably a misunderstanding of Theophrastus, and not necessarily one that reflects Athenaeus or his source having particular plants in mind, it is probably inappropriate to attach too much importance to it in seeking to identify the plant concerned. *Hudnon* is probably in any case a non-specific name for truffles in general, and *mukês* for fungi.⁴⁸¹

Maggiulli (1977) 120 argues that it is unclear whether *pezis* (described by Pliny, though not by Theophrastus, as lacking a stem as well as roots) is a fungus of the genus *Peziza*,⁴⁸² perhaps *Peziza aurantia* Persoon (so J. André, *Pline l'ancien* vol. 19, CB 1964, p. 111), on §38, or *Lycoperdon*, the puff-ball.⁴⁸³ Houghton (1885) identified *pezis* as the giant puff-ball (*Lycoperdon giganteum* or *bovista* L. = *Langermannia gigantea* (Pers.) Rostkovius; so too LSJ) on the grounds that Athenaeus here includes it in a list of smooth-skinned plants. But if Athenaeus' doing so is the result of a careless reading of Theophrastus, it is perhaps unwise, here as in the case of the *hudnon* above, to assume that he had the nature of a particular species clearly in mind. Moreover, Athenaeus' *pezis* may itself be a mistake. *Puxos*, which is what the MSS of Theophrastus have, is usually the box-tree, but Amigues (1988) 84 n. 12 notes that *puxos* is the modern Greek name for the morel, *Morchella*, and argues for retaining the MSS reading in that sense; cf. also Amigues (1993) 13-15, with discussion of the etymology.

For the *geraneion* see below on **413** no. 6.

6 *HP* 1.6.9] Athenaeus 2.60 62a

Schweighäuser (1801-7) 417. Houghton (1885) 42-6. Buller (1914-16) 61-2. Steier, art. 'Pilze', *RE* 20.2 (1950) 1372-86, at 1381-3. Winter (1951) 63-4. Carnoy (1959) 40. Maggiulli (1977) 133-4, 137. Sharples-Minter (1983) 154-5. Amigues (1988) 84-5 n. 12, 86-7 n. 20.

⁴⁸¹ Winter derives *hudnon* from the roots of *hus* and *edanos*, "eaten by pigs"; see below on **413** no. 6. R. Strömberg, *Griechische Pflanzennamen*, Göteborg 1940 (Göteborgs Högskolas Årsskrift 46.1) 79, derives it rather from *huein* "to rain"; see above on **400**.

⁴⁸² Cup-shaped fungi, some of which are found in Britain but for which there seems to be no more specific common English name; French *pézize*. *Peziza aurantia* is now known in Italy as "Orecchiette"; it shares with some other *Pezizae*, but not all, the feature of lacking a stalk.

⁴⁸³ Carnoy (1959) 210 derives the Greek name from *bdeô*, with the same indelicate allusion to the scattering of seeds as in the name *Lycoperdon* and in the French name *Vesse-de-loup*; the name "puff-ball" itself indeed refers more decorously to the same phenomenon.

Theophrastus refers, in arguing that not every underground plant structure is a root, to “the *hudnon*, and what some call *aschion*, and the *ouïngon* and any other underground plant”. Athenaeus omits the *ouïngon* altogether, refers to *geraneion* rather than *aschion*, and treats *geraneion* as an alternative name for the *hudnon* rather than as something distinct from it.

The *geraneion* occurred also in Athenaeus in no. 5 above, where the MS of Theophrastus has *kranion* but was emended by Wimmer to *keraunion*. *geraneion* as the name of a fungus (as opposed to *geranion*, geranium, the flowering plant) occurs in Greek only in Athenaeus in our **413** nos. 5 and 6, and in Eustathius, *On Homer's Iliad* 15.302 (vol. 3 p. 734.3 van der Valk), which is dependent on the present passage. However *geranion* appears also in one MS (Q) of Pliny 19.36⁴⁸⁴ and in the list of contents in book 1 of Pliny's *Natural History* 1 (CB vol. 1 p. 103.28 Beaujeu). The only other occurrence of *keraunion* in Greek is in Galen, *On Substitutes*, vol. 19 p. 731 Kühn. Guillaume Budé suggested that Athenaeus' *geraneion* was simply a corruption of *keraunion*. This suggestion was rejected by de Saumaise, Hardouin and Schweighäuser, because of the occurrence of *geranium* in Pliny's list of contents; but it was accepted by Wimmer and Houghton. *geraneion* would make little sense if interpreted as “crane-truffle”, from the bird *geranos* (the crane, *Grus cinerea*), but Winter notes that the *Etymologicum Magnum* (227.51) gives *geranos* as a Cyrenean equivalent for *ombros*. This could mean “rain” (for the connection of which with truffles see **400** and above n. 481); but Winter, followed by Amigues, argues that it rather means “pig”, in the light of Hesychius' *ombros* = *choiridion* (s.v., no. 682, vol. 2 p. 756 Latte, but bracketed by him) and *gronades* = sows (s.v., no. 964, vol. 1 p. 392 Latte)—pigs being used to detect truffles. *Keraunion* and *kranion*, Winter further argues, are forms reflecting the fact that the word was not understood, and based on popular etymology, in the former case reflecting the belief that truffles were engendered by thunder, for which cf. **400**.

Houghton (1885) 43 and Buller (1914-16) 61-2 interpret Theophrastus' *aschion*—a name which appears nowhere else—as a type of

⁴⁸⁴ In a supplement by Pliny to what he and Athenaeus in **400A** (q.v.) both take from a common source identified by the latter as Theophrastus; to the Cyrenian *misu* and the Thracian *iton*, in Athenaeus, Pliny adds “what they call *geranion* in Greece”. The other MSS of Pliny have *ceraunion* (or a more or less garbled version thereof).

truffle.⁴⁸⁵ Amigues (1988) 86-7 suggests a species such as *Scleroderma verrucosum* Bull, which has a black fruit-body which resembles a truffle and emerges from the soil once ripe. Athenaeus' substitution of *geraneion* for *aschion* may then result from its being mentioned in **413** no. 5 just before—whether the change was an informed one or not.

ouïngon, Heinsius' reading in the text of Theophrastus following Gaza's Latin translation, is the name not of a fungus at all but of a plant known to Theophrastus from Egypt, *Colocasia esculenta* (L.) Schott,⁴⁸⁶ which produces large edible underground tubers; it is called *ouïngon* at *HP* 1.1.7, *ouïton* at *HP* 1.6.11, and *oetum* by Pliny 21.88. Sharples-Minter (1983) 155 accepted the reading *ouïngon* in *HP* 1.6.9 and interpreted it in this way, suggesting that the tuber was not regarded as a root; cf. *HP* 1.1.7. However 1.6.11 treats the tuber as a root rather than a fruit; and the argument in Sharples-Minter was based in part on Schneider's seeming indication that the principal MS of *HP*, Vat. Urbinas gr. 61 (9th-10th century) had the reading *ouïngon*. (Schneider [1818-21] vol. 5 p. 5 line 2). But Schneider's note relates to another issue; he may have included *ouïngon* not as an indication of the reading of the Urbinas but simply as part of the lemma from his own printed text. And Amigues (1988) 20 makes it clear that the original hand in the MS wrote just *oui*. The corrector changed this to *ouïpon*, which is the reading of the inferior MSS; finally a marginal note *ouïton* was added, perhaps in the fourteenth century (cf. Amigues [1988] xlv f.). *ouïton* in the sense of the truffle-like fungus (for which see above **400**) is the preferred reading of Amigues (1988) 87; so too Schneider (1818-21) vol. 3 34.

11 *HP* 1.9.5] Varro, *On Farming* 1.7.6

See also Pliny 12.11, where Theophrastus is not cited by name.

13 *HP* 2.1.3] Pliny 15.138

Amigues (1988) 117 n. 7.

⁴⁸⁵ Hort (1916-26) vol. 2 p. 442 suggested the giant puff-ball, *Lycoperdon giganteum*; similarly Carnoy (1959) 40. But this, as Amigues (1988) 86 points out, does not grow underground.

⁴⁸⁶ I.e. the plant known in Polynesia as the taro root. Cf. Mabberley (1987) 136; Amigues (1988) 89. J. André, *Pline l'ancien* vol. 24, CB 1971, 143-6 identifies the *aron* of *HP* 7.12.2 as *Colocasia antiquorum* L., rather than cuckoo-pint, *Arum maculatum* L. with Hort ([1916-26] vol. 2 442).

Pliny says that Democritus (i.e. Bolus?; *FVS* 68 B 300 §8) and Theophrastus doubt whether laurel can be grown from a slip (*ramus*). In fact Theophrastus says that it can be grown from a piece torn off, but only if part of the root or stock is attached.

- 14 *HP* 2.2.2] Galen, *Explanation of Hippocratic Expressions*, on *katakourên* (vol. 19 p. 109.7-10 Kühn)

Galen attributes to Theophrastus the application of *kourizomenê* to the fir (*elatê*; see above on **403**). He in fact applies it to the cypress, the fir having been mentioned just before. *kourizomenê* is translated by Hort “shorn” but by Amigues more specifically “étêté”; cf. English “pollard” from “poll” = head.

- 16 *HP* 2.2.7] Apollonius, 43
Amigues (1988) p. 123 n. 15.

Theophrastus, discussing changes in plants due to locality, says that in Egypt both seed and cuttings from a pomegranate-tree with acid fruit can produce one with a sweet or wine-like taste, and that pomegranates raised from seed near Soli in Cilicia have no stones (are *apurênoi*). Apollonius (who here gives no book number) reverses the order of the two items, and says that in Egypt the *seeds* (*kokkoi*) have a wine-like taste *generally* (*di’ holou*).

- 18 *HP* 2.5.5] Athenaeus, 2.85 71C
See above on **393**; also below on **417** no. 14.

- 22 *HP* 3.3.8, 3.7.3] Hesychius, *Lexicon*, on *kuparos* (no. 4639, vol. 2 p. 550.31-3 Latte), etc.
Amigues (1989) 130 n. 22.

In 3.3.8 Theophrastus is discussing whether certain trees bear flowers at all, and mentions the *kuttaros* of the Aleppo pine (*pitus*, *Pinus halepensis* Miller) as in some people’s view not a flower but analogous to the wild figs (*êrina*) that fall early (see above on **393** and **394**). In 3.7.3 he lists things that appear on trees other than leaves, flowers and fruit (such as oak-galls—3.7.4), and includes the *kuttaros* of the pine (*peukê*) among these. The *kuttaros* is in fact the male inflorescence, which, as the references listed in no. 22 observe, is shaped like a

little ear of corn with large grains, and dries up, becomes like a bag and falls. These details do not appear in our text of Theophrastus, but the passages which quote them do not claim that they do. At *HP* 4.8.7 Theophrastus uses *kuttaros* for each of the “cells” in the “head” of the “Egyptian bean”, *Nelumbo nucifera* Gaertner, which as a whole he likens to a wasp’s nest (Amigues, loc. cit.). Aristophanes uses the word for the cells of insect grubs (*Wasps* 1111), for a baby boy’s penis like its father’s, “curved like a pine-cone” (*Thesmophoriazusae* 516),⁴⁸⁷ and for the vault of heaven (*Peace* 199). Hesychius’ *kuparos* is a variant form.⁴⁸⁸

- 23 *HP* 3.5.1] Scholium on Theocritus’ *Idyll* 9.23 (a, p. 219.15-17 Wendel) Hort (1916-26) vol. 1 p. 185 n. 9. Amigues (1989) 13 and 132 nn. 2-3.

Theophrastus here says that the pine (*peukê*), fir (*elatê*) and oak produce three sets of buds a year. He goes on to give a detailed description of the growth of the second set of buds; the word *korunê* which the scholium cites appears only in this second part of the discussion. The scholium refers to the fir; Hort states that Theophrastus intends the part of his discussion in which *korunê* appears to apply only to the oak. However, while *HP* 3.5.2, on galls, clearly *is* concerned only with the oak, Amigues shows that *ta men . . . ta de* in the penultimate sentence of 3.5.1 are nominatives and that Theophrastus is there distinguishing between the oak on the one hand and the conifers on the other. The scholium *is* therefore justified in linking the *korunê* with the fir.

- 27 *HP* 3.9.5] Athenaeus, 2.49 57B

Athenaeus cites Theophrastus as calling the fruit of the *peukê* (pine) a cone. He does so only by implication, comparing the *kônos* of the *pîtus* (Aleppo pine) with it. See above, on **403**.

⁴⁸⁷ See F.H.M. Blaydes, ed., *Aristophanis Thesmophoriazusae*, Halle: in Orphanotrophei libraria, 1880, 186-7; J. van Leeuwen, ed., *Aristophanis Thesmophoriazusae*, Leiden: Sijthoff, 1904, 69; B.B. Rogers, ed., *The Thesmophoriazusae of Aristophanes*, London: George Bell, 1911, 58. For a speculative explanation of the joke see J. Henderson, *The Maculate Muse*, New Haven: Yale University Press, 1975, 109.

⁴⁸⁸ Because of the similarity of the words it may be opportune to mention here that at Hesychius s.v. *kunaros* Theophrastus’ name only appears as the result of a false emendation in the Aldine edition; this resulted from the fact that the quotation of Didymus in Athenaeus 2.70c on which the first part of the Hesychius entry is

- 37 *HP* 4.1.1] Scholium on Oribasius' *Medical Collection* 11A70 (CMG vol. 6.1.2 p. 92, ad 2)

The scholium cites Theophrastus, *HP* for the term *paliskios* ("shady") and the contrasted *epêlios* and *prosêlios* ("sunny"). Our MSS of Theophrastus have rather *euêlios* ("well-sunned") and *prosêlios* (though the first hand in U has *-eilos* for *-elios* in each case; cf. Amigues (1989) 201 n. 1). *epêlios* is close in meaning to *prosêlios*, and is otherwise unknown (there are no occurrences of *epêlios* or *ephêlios* in the index to the Thesaurus Linguae Graecae CD-ROM "D" or in LSJ), whereas *euêlios* is relatively common. It seems likely that *epêlios* is a corruption.

- 39 *HP* 4.2.5] Scholium on Nicander's *Antidotes* 99 (a, 3-5, p. 62 Geymonat)

To Theophrastus' description of the kernel of the *persea* tree (*Mimusops schimperi* Hochst.; Amigues [1989] 206f.) the scholium adds the additional point that kernels with woody rind are generally called *karua*. However, this is not attributed to Theophrastus himself.

- 41 *HP* 4.4.1] Pliny, 16.144 and Plutarch, *Table-Talk* 3.2.1 648C

R. Flacelière and É. Chambry, *Plutarque: Vies* vol. 9 (CB, 1975) 237. Amigues (1989) 219 n. 5. Teodorsson (1989-90) vol. 1 315-16.

Theophrastus says that ivy is not found in Syria more than five days' journey from the sea. Pliny reports him as saying it is not found in "Asia", apparently implying that it is not found there at all. Theophrastus then goes on to describe how Harpalus, Alexander the Great's treasurer, tried but failed to grow ivy in Babylon. Pliny's report is close to Theophrastus; Plutarch (who also has the same story more briefly, without naming Theophrastus, in his *Life of Alexander*, 35.15) adds further details—Alexander's request, the trees to give shade, the withering of the ivy—giving the impression that all this comes from Theophrastus. He explains the failure by ivy being itself hot, for which cf. *HP* 2.7.3, 5.3.4.

In addition to the passages in which Plutarch refers to Theophrastus in botanical contexts by name (398; the present passage; 415; 417 no. 22; 428), there are a number of other parallels between Plutarch's

based is closely followed there by a citation of Theophrastus (= 413 no. 35). So Schmidt's note (no. 60, vol. 3 p. 553.12-13 [Halle, 1861, repr. Amsterdam: Hakkert, 1965]); Latte, no. 4562, vol. 2 p. 547.30-31 does not mention the false reading in Hesychius at all.

writings and Theophrastus' botanical works. Some indeed are mere commonplaces, and even where the points at issue are more distinctive there are sometimes other texts too which convey the same information. The following however seem particularly noteworthy: *HP* 4.16.5 \approx Plutarch, *Moralia* 911E (oil bad for tree roots); *HP* 5.6.1 \approx *Moralia* 724F (bending of palm-wood); *HP* 8.6.6 \approx *Moralia* 913A (spring rains in Sicily); *HP* 8.7.6 \approx *Moralia* 701A (relative importance of soil and weather for crops; the disagreement between Plutarch and Theophrastus in their treatment of the same proverbial saying here is only superficial); *CP* 6.5.1 \approx *Moralia* 710E, 1096A (effect of perfume on vultures and beetles; see n. 220 above); *CP* 6.20.4 \approx *Moralia* 917E (hunting more difficult in spring because of the scent of the flowers). Cf. also *CP* 6.17.1 with *Moralia* 626B = Hieronymus fr. 53 Wehrli (flowers more fragrant at a distance; see n. 564 below).

- 42 *HP* 4.4.2] Athenaeus, 3.26 83DF

See above on **394**.

- 43 *HP* 4.4.9] Apollonius, 32

Theophrastus states that the chick pea (*erebinthos*, *Cicer arietinum* L.) and lentil (*phakos*, *Lens culinaris* Medicus) found in Greece are not found in India; Apollonius adds the bean (*kuamos*, *Vicia faba* L.) to the list. Conceivably our texts of Theophrastus are defective here; or else Apollonius is using a text to which additions have been made. He here cites the *HP* explicitly, but without a book number.—See also above on **384** no. 1.

- 44 *HP* 4.7.2] Athenaeus, *The Sophists at Dinner* 2.59 61EF

Schweighäuser (1801-7) 1.414. Buller (1914-16) 47-8. Thorndike (1924) 84. Maggiulli (1977) 142-3. Sharples-Minter (1983) 154. Amigues (1989) 251.

Theophrastus' "fungi" that are turned to stone by the sun are probably coral, on which cf. Theophrastus *On Stones* 38 with Vallance (1988) 33-4, and D'A. W. Thompson (1947) 125.⁴⁸⁹ Athenaeus places them near the Pillars of Hercules, whereas in Theophrastus they are in the Red Sea; but Theophrastus has just mentioned the Pillars of

⁴⁸⁹ Thorndike remarks that coral was still believed to be vegetable by J. Hill, *Theophrastus' History of Stones* (London: printed for the author, 1746).

Hercules at 4.7.1, and Athenaeus or his source was probably misled by this. Theophrastus is reflected more accurately, without being actually named, in a report by Pliny, 13.139.

- 48 *HP* 4.12.1] Harpocraton s.v. *holoschoinôî*, etc.

It is significant that Harpocraton, whose lexicon (of uncertain date) was compiled from earlier authorities, here cites book 4 of *HP*, for he is one of the authors who have the alternative numbering for the later books. See above on **384** no. 1; Keaney (1968) 295; Sollenberger (1988) 22 n. 6; Amigues (forthcoming).

- 52 *HP* 5.3.7] Pliny, 13.101-2

R. Meiggs, *Trees and Timber in the Ancient Mediterranean World*, Oxford: Clarendon Press, 1982, 288-90. Amigues (1993) 71-2.

Theophrastus describes thyrine wood (*Callitris quadrivalvis* Vent.). Pliny reproduces his account with minor rearrangements and additions. Theophrastus says that this wood is found near the temple of Zeus Ammon (at the oasis of Siwa), but not, as in Pliny, that it is *best* there; and he mentions its use for roofs but not also for floors. He also describes the root as *oulotaton*, which Hort translates by “of very compact texture”, whereas Pliny says that nothing is *crispus* than the root. This is translated by Rackham (*Pliny: Natural History*, vol. 4, *LCL* 1945, p. 149) as “veined” and by Ernout (*Plinie l'ancien*, vol. 13, *CB* 1956, 50) as “madré”. But at *Plant Explanations* 6.11.8 Einarson and Link translate *oulos* as “with curly grain”, and “curly” is the primary meaning of Latin *crispus*. So Pliny’s translation seems accurate, the roots being curly-grained and dense. For Pliny’s dating of Theophrastus in this passage see above, on **408**.

- 53 *HP* 5.4.3] scholium on Homer’s *Iliad* 23.328, etc.

The scholium states that oak (*drus*) does not decay when placed in earth or in fresh water, but does decay in sea water. This reports Theophrastus accurately; see also above on **403**.⁴⁹⁰ The Theophrastus passage is also cited, without Theophrastus being named, by Pliny 16.218, but Pliny distinguishes between the *robur* (oak, *Quercus robur*

⁴⁹⁰ In the translation of **413** no. 53 reference should be to the pine, not to the fir (corrected in the second printing).

L.) as being preserved in earth and the *quercus* (holm-oak or esculent oak, *Quercus ilex* L.) in water. This is then copied in turn by Erasmus, *Parabolae* 310.453 Margolin (1975), but he refers to the *quercus* in earth, whether through using the text of Theophrastus to correct Pliny or independently; cf. Margolin (1975) p. 311 n.

- 55 *HP* 5.8.3] Scholium on Aristophanes' *Peace* 1154 (b, *Schol. Arist.* vol. 2.2 p. 165.1)

Amigues (1993) 105.

Where Theophrastus distinguishes garland-myrtle and large myrtle, the scholium refers to garland-myrtle and fruit-bearing-myrtle.

ibid.] Pliny, 3.57-8 = **599**.

In **599** Pliny says that Theophrastus was the first foreigner to write carefully about the Romans; but the passage from *HP* 5.8.3 which is the only one he actually cites there, relates—as does the general context in Pliny—to Italian geography rather than to the Romans as such. It is unclear whether Pliny had other passages of Theophrastus more specifically about the Romans in mind or not. For Pliny's dating of Theophrastus in this and other passages see above on **408**.

- 59 *HP* 6.2.4] Pliny 15.1

Lloyd (1983) 147 n. 99.

Lloyd notes that here, as at 21.57 (where Theophrastus is not named) Pliny contrasts the extent of the localities in which plants (at 21.57 the thyme, here the olive) were found in his own day with what Theophrastus says in *HP* 6.2.4 about their being found only near the sea. For Pliny's dating of Theophrastus in this passage see above on **408**.

Simon de Phares, *Recueil des plus célèbres astrologues*, an. 4919 (p. 96.32-4 Wickersheimer, ed. Paris 1929), writing at the end of the fifteenth century, cites this reference in Pliny in his general notice on Theophrastus, but without repeating its content. He there refers to Theophrastus as “the second” of that name, because a misunderstanding of, or variant reading in, Pliny 7.196 = **732** (cf. apparatus ad loc.) has caused him to name Theophrastus as the Egyptian inventor of weaving (*Receuil*, an. 2345).

- 60 6.4.10] Athenaeus, 2.83 70DE

Amigues (1993) 76.

Also reported, without Theophrastus being named, by Pliny 21.97, with errors; cf. W.H.S. Jones (*LCL* 1959, ²1969) p. 232-3 nn.(b)-(c). Athenaeus cites Theophrastus immediately after reporting similar information from Phantias' *On Plants* (Pha(i)nias fr. 38 Wehrli).

- 65 *HP* 6.6.11] Athenaeus, 15.27 680e; Eustathius, *On Homer's Iliad* 16.123 (vol. 3 p. 819.5 van der Valk)

Athenaeus, and following him Eustathius, give Theophrastus' list of flowers grown from seed rather as a list of flowers used in wreaths, plants grown for their flowers indeed being the general concern of the Theophrastean context.

- 69 *HP* 6.8.3] Athenaeus 15.24 679cd, 15.28 681f.

Similarly, without Theophrastus being named, Pliny 21.67.

- 76 *HP* 7.4.4] Athenaeus, 9.9 369F

Wellmann (1921) 35. Amigues (1988) 76-7.

Athenaeus, in a free citation of Theophrastus, makes him refer to curly-leaved and wild *rhapphanos* (cabbage, *Brassica* spp.) whereas in fact he mentions a smooth-leaved type as well. (The Theophrastean text is more accurately reflected, though without Theophrastus being named, at Cato *On Agriculture* 157 and Pliny 20.79, as Wellmann notes.) Athenaeus also adds an identification of *rhapphanos* as *krambê*; Amigues rightly explains this as due to a desire to avoid misunderstanding of the old-fashioned term *rhapphanos*, but it is perhaps questionable whether she is right to take the present passage in Athenaeus as supporting the reading *krambê* at *HP* 1.3.1.

- 77 *HP* 7.4.5] Athenaeus, 2.79 69AB

Theophrastus distinguishes white lettuce and three *other* kinds (*Lactuca* spp.); Athenaeus misquotes as three kinds in all.

- 79 *HP* 7.6.3] Scholium on Nicander's *Remedies* 597 (c, p. 225.16-226.1 Crugnola)

J. André, *Pline l'Ancien* vol. 19, CB 1964, p. 114.

The scholium reports Theophrastus as saying that horse-celery (alexanders, *Smyrnium olusatrum* L.) grows in rocky places. In our texts of *HP* Theophrastus says that both horse-celery and marsh-celery (*Apium graveolens* L.) grow equally everywhere. Since he has previously referred to marsh-celery as growing by irrigation-ditches and in marshes, it may be that a reference to rocky places has dropped out of the account of horse-celery in our texts of Theophrastus, and that the reference to both growing everywhere refers rather to geographical distribution. Pliny 19.124, without mentioning Theophrastus by name, says that horse-celery grows in dry places; Dioscorides *De materia medica* 3.67, similarly not naming Theophrastus, that horse-celery grows in shady places and by marshes.

- 80 *HP* 7.7.2] *Collection of Useful Expressions*, on *akalêphê* (vol. 1 p. 60.24-5 Bachmann), etc.

W. Crönert, 'Animadversiones in Photii fragmentum Berolinense', *Rheinisches Museum* 62 (1907) 470-482, at 480. Regenbogen (1940) 1438. D'A.W. Thompson (1947) 5 and 118.

The same information appears in the *Collection*, in Photius and in the Suda: "Aristotle too (mentions) sea-nettles (i.e. the sea-anemone; cf. Thompson) in the first book *On Animals* (*HA* 1.1 487a25), and Theophrastus (does so) in the seventh book of *Plant (Matters)*". There is no reference to this in the surviving texts of Theophrastus. He does however mention the *land-nettle* (*akaluphê*, a variant spelling) in *HP* 7.7.2; and Crönert proposed to remove the discrepancy by reading, in Photius, "and Theophrastus (mentions) <the land->(nettle)", so that the reference there would become an accurate report of the *HP*. So too Regenbogen for the Suda. For the "sea-nettle" see also *HA* 1.1 487b12, *PA* 4.5 681a36. (I owe these references to Pierre Pellegrin.)

- 82 *HP* 7.12.1] Eustathius, *On Homer's Iliad* 21.14 (vol. 4 p. 175.43 van der Valk)

Eustathius' source ("one of the ancients") has transformed Theophrastus' reference to a type of *squill* called "Epimenides"⁴⁹¹ into a

⁴⁹¹ According to Hort (1916-26) vol. 2 477 this is *Ornithogalum pyrenaicum* L., Bath asparagus; cf. Scarborough (1992) 147.

general name for the root of the asphodel, mentioned in the same passage of Theophrastus.

- 83 *HP* 7.13.2] Pliny, 21.109; scholium on Theocritus' *Idyll* 1.52 (a, p. 49.10-12 Wendel)

Wellmann (1889) 549-50. J.M. Verpoorten, Les noms grecs et latins de l'asphodèle, *Antiquité Classique* 31 (1962) 111-129, at 119. Negbi 29-30. Amigues (1988) 79-80.

Pliny cites "Theophrastus and Greeks" for the stalk of the asphodel being called *antherikos* and the bulb *asphodelos*; similarly the scholium on Theocritus, except that here the stalk is called *antherix*. The stalk is called *antherikos* in *HP* 7.13.2, but the specific application of *asphodelos* to the bulb is not found there, and neither are the further details given in both Pliny and the scholium. It is not indeed clear whether Pliny intends to imply that Theophrastus is his source for the additional material; the scholium does seem to do so. Amigues claims that at *HP* 6.2.9 *antherikos* indicates the whole plant; but, as Hort notes, here too it is the stalk that is particularly in question. Cf. above on **413** no. 3.

- 84 *HP* 7.13.8] Pliny, 19.32; Athenaeus, 2.67 64D

Athenaeus cites two points from the text of Theophrastus; (i) *bolboi* in the Crimea that are sweet enough to be eaten raw (for which he also cites Phanias = fr. 45 Wehrli), and (ii) another type that bears "wool". This second type is also reported by Pliny; see above, on **408**.

- 85 *HP* 7.15.1] Athenaeus, 15.32 684E

Athenaeus abbreviates Theophrastus, and says that the swallow-plant (greater celandine, *Chelidonium maius* L.) blooms with the swallow (*chelidoni*), rather than with the swallow-wind (*chelidoniâi*—the difference amounts to two letters).

- 86 *HP* 8.1.1] Harpocraton, *Lexicon*, on *melinê* (vol. 1 p. 202.5-6 Dindorf), etc.

Schneider (1818-21) vol. 5 xxix, on vol. 1 p. 254.10 (cf. id. vol. 3 p. 640); Hort (1916-26) vol. 2 142 n. 3.

Theophrastus lists *kenchros* (millet, *Panicum miliaceum* L.), *elumos* (Italian millet, *Setaria italica* (L.) Pal.) and *sesamon* (sesame, *Sesamum indicum* L.); the lexica *kenchros*, *melinê* and *elumos*. Schneider proposed substituting

melinê, the Attic term for Italian millet,⁴⁹² for *elumos* in the text of Theophrastus here and in *HP* 4.4.10, 8.11.1. For the citing of book 8 as book 7 see above on **384** no. 1.

89 *HP* 8.4.5] Apollonius, 33

Apollonius cites this as from book 7; see above on **384** no. 1.

92 *HP* 8.9.2] Galen, *On the Nutritive Faculties* 1.13.11 (*CMG* vol. 5.4.2 p. 237.21-238.3)

Regenbogen (1940) 1442. Keaney (1968) 294. Bertier (1972) 53-4. Amigues (forthcoming).

Galen cites this as from book 7; see above, on **384** no. 1. Regenbogen suggests that Galen may be drawing on an intermediate source that used the same recension as Apollonius. But in no. 88 above Galen, in the same work, cites book 8 with the number familiar to us. Keaney suggests that he was using two different texts of Theophrastus; Amigues that he was using a nine-book edition which still had traces of its original numbering. The implications of the Theophrastus passage and Galen's citation of it for the identification of various types of cereals are discussed by Bertier (1972).

93 *HP* 8.11.7] Apollonius, 34

In the text of Apollonius this follows immediately on **413** no. 89 above, neither Theophrastus nor the *HP* being named but reference simply being made to "the same philosopher". **413** no. 89 cites *HP* 8 as "book 7", and the same reference is presumably intended here.

96 *HP* 9.7.3] Athenaeus 15.28 681F

On the aromatic iris cf. Negbi (1989) 31.

100-1 *HP* 9.9.2, 9.11.1] scholia on Nicander, *Remedies* 52, 500, 565 (pp. 54.7-8, 199.2-5, 216.9-10 Crugnola)

On *panakes*, "all-heal", see Scarborough (1978) 362-4. The scholium to Nicander 565 seems to misreport *HP* 9.11.1 in saying that *tithumallos*

⁴⁹² Herodotus 3.117, Sophocles fr. 608 Pearson, Xenophon *Anabasis* 2.4.13, Demosthenes 8.45; or *melinos*, *HP* 8.1.4, Diocles fr. 113 Wellmann (ap. Galen *On the Natural Faculties* 1.13, vol. 6 p. 512.3 Kühn).

(*Euphorbia* spp.; cf. Scarborough (1978) 368) is a type of *panakes*; did the scholiast have a text that omitted the first *kai* in 9.11.1?

- 102 *HP* 9.11.5] Photius, *Lexicon*, on *noruê* (part 1 p. 303.1-2 Porson)

S.A. Naber, *Photii Lexicon* (Leiden: Brill, 1864-5) vol. 1 p. 449 n. 4. Scarborough (1978) 366-9.

Photius reports Theophrastus as saying that *truchnos*, [*n*]*oruê*⁴⁹³ and *tithumallos* (spurge, *Euphorbia*) are *sunônuma*. Theophrastus in fact mentions only *struchnos* and *tithumallos*, and explains that each is the name of more than one plant with different effects, *struchnos* including both a plant that induces sleep (*Withania somnifera* (L.) Dunal, according to Hort [1916-26] vol. 2 p. 478, but *Atropa belladonna* L., deadly nightshade, according to Scarborough [1978] 367) and thorn-apple, *Datura Stramonium* L.⁴⁹⁴ Naber therefore suggested that *oruê*⁴⁹⁵ had fallen out of the text of Theophrastus.

- 103 *HP* 9.11.11] Apollonius, 48; Dioscorides, *De Materia Medica* 3.74. 4 (vol. 2 p. 87.11-15 Wellmann)

On *libanôtis akarpós*, *Rosmarinus sterile* or *Lactuca graeca*, see Scarborough (1978), 369. This is one of two citations in Dioscorides of Theophrastus by name, the other being no. 107 below. On whether Dioscorides used Theophrastus directly elsewhere cf. Wellmann (1889); Riddle (1985) 14-15. Apollonius here refers explicitly to the *HP* but without giving a book number.

- 104 *HP* 9.12.1] scholium on Nicander's *Remedies* 656 (b, p. 245.1-2 Crugnola)

On "white chameleon" (pine-thistle, *Atractylis gummifera* L.) see Scarborough (1978) 369-70, and below on **417** no. 14. Cf. also Wellmann (1889) 555-6, 564, (1921) 6.

- 105 *HP* 9.13.3, 9.20.4] Apollonius, 29

⁴⁹³ *noruê* was emended to *oruê* by Naber. The corruption is early, for the entry is placed among words beginning with *n* in Photius' ordering.

⁴⁹⁴ On which cf. Scarborough (1978) 367-8; Lloyd (1983) 128; Riddle (1985) 237 nn. 166-7.

⁴⁹⁵ For which cf. also Hesychius s.v. *noruê*, 656, vol. 2 p. 716.32 Latte, and Herodian, *Techn. Rel.* 1.306, *GG* vol. 3.1.1 p. 306.29 Lentz; *oruê* in the MSS, changed by Lentz to *noruê*. Neither author names Theophrastus.

Regenbogen (1940) 1439.

On *aristolochia* (birthwort, *Aristolochia rotunda* L.) see Scarborough (1978) 373. The Galen reference placed here in the first printing of our text volume should be transferred to no. 115 below, q.v.

- 107 9.17.3] Apollonius, 50; Dioscorides, *De Materia Medica* 5.108.2 (vol. 3 p. 79.11-13 Wellmann); Pliny, 36.156

Wellmann (1889) 549 and n. 2. K.C. Bailey, *The Elder Pliny's Chapters on Chemical Subjects*, London: Arnold, 1932, II.265. Scarborough (1978) 362.

Theophrastus, who has been speaking of the way in which a person's constitution and habitual exposure to a poison can remove its effect, refers to wagers on drinking hellebore (*Helleborus cyclophyllus* Boiss., or *Veratrum album* L.) without experiencing its purgative effect (on which cf. G. Majno, *The Healing Hand*, Cambridge, Mass. 1975, 188-91), and refers to the use of pumice-stone as a prophylactic. This prompts him to refer to the effect of pumice-stone in preventing liquid boiling or bubbling, as evidence for its drying effect and absorption of the vapour. In the MSS text of Theophrastus the liquid is not specified, but Schneider added a reference to wine from the Pliny passage, where the reference is probably to fermentation; Theophrastus' *zeonta* can indicate this. Fermenting wine is also mentioned in the citation of Theophrastus at Dioscorides 5.108.2 and in Oribasius, Coll. med. 13K6 (*CMG* t.6.1.2 p. 167.18-20. Theophrastus is named here, and this text should be added to **413** no. 106 in the text volume.). Dioscorides and Oribasius say that pumice-stone stops wine bubbling at once, while Theophrastus actually says not only at once, but permanently.

Apollonius quotes Theophrastus verbatim, referring to this text as coming from the "last book" of *HP*—which is correct, even though for him this book, our 9, was book 8; see on **413** no. 109, and also above on **384** no. 1. In Pliny Theophrastus is presented as referring to the use of pumice-stone as a prophylactic in *wine-drinking* contests (adding that there is a risk if the wine is not drunk in a single draught; this is not in Theophrastus). Pliny's account probably reflects a too hasty reading of Theophrastus, linking with wine both the physiological effect and that of preventing boiling or bubbling, where Theophrastus relates the latter to wine but the former to hellebore. (Bailey describes Pliny as "abbreviating to the point of obscurity" what Theophrastus says.)

- 108 *HP* 9.17.4] Apollonius, *Amazing Stories* 31; Stephanus of Byzantium, *Ethnica*, on *Apsynthos* (p. 153.10-12 Meineke)

Rose (1863) 332. Oder (1890) 75. H. Diels, 'Epimenides von Kreta', *Sitzb. Berl.* 1891 387-403, at 393-4. Wellmann (1921) 9. W. Kroll, 'Bolos und Demokritos', *Hermes* 69 (1934) 228-232, at 230. Giannini (1964) 123-4. Fraser (1972) vol. 2 637-9. J.P. Hershbelle, 'Democritus and the beginnings of Greek Alchemy', *Ambix* 34 (1987) 5-20, at 7.

Theophrastus refers to sheep (*probata*) in Pontus that eat wormwood (*apsinthion*, *Artemisia absinthium* L.) and—"as some say"⁴⁹⁶—have no bile.⁴⁹⁷ Aristotle at *PA* 4.2 677a30ff. asserts that absence of bile leads to longer life;⁴⁹⁸ bile is bitter, so perhaps the thought is that these sheep are so lacking in bitterness that they can tolerate wormwood where others cannot, or even need it in compensation. Eating wormwood *can* indeed improve the health of cattle, without any reference to bile, by killing intestinal parasites (I owe this information to Colin Mills, concerning cattle in Norfolk).

In addition to Apollonius and Stephanus, who cite Theophrastus by name (see below), similar reports are widespread. Both eating wormwood and absence of bile are mentioned by Pliny 11.194 and 27.45; the creatures are not identified, but the place is given as Pontus. Absence of bile, though not the eating of wormwood, are mentioned by Aristotle *PA* 4.2 677a3 (but at Chalcis in Euboea; contrasted with sheep in Naxos with an extra large gall-bladder), Aelian 11.29 (sheep in Pontus have no gall-bladder, those on Naxos have two) and *ibid.* 16.26 (sheep in cold countries generally, and especially in Scythia, have no bile in winter when they cannot get fresh pasture; Aelian is castigated for the generality of this report by Oder, 75.) Conversely, Aelian 5.27, in the context of **363** no. 1, does not mention bile but cites Alexander of Myndus for the flocks in Pontus growing fat on wormwood.⁴⁹⁹

⁴⁹⁶ Oder (1890) 75 notes that this qualification is dropped in the citations in Stephanus and Apollonius.

⁴⁹⁷ *cholē* can mean either "bile, gall" or the gall-bladder. Some of the texts below are clearly concerned with the latter (Aelian 11.29), others with the amount of bile in the gall-bladder at different seasons (Aelian 16.26). But the distinction does not seem central to the argument.

⁴⁹⁸ Cf. *Posterior Analytics* 2.17 99b5: Pellegrin (1986,1) 142-3 and n. 42.

⁴⁹⁹ See also above on **355A** 3-4. The detail of the sheep being *fattened* appears in Theophrastus but not in Apollonius or Stephanus (below).

The reports in Apollonius and in Stephanus are closer to each other in their wording than either is to Theophrastus.⁵⁰⁰ However, Stephanus, who wrote in the sixth century A.D. but whose work survives only in the form of an epitome, appears to cite Theophrastus from a report by the Hellenistic writer Bolus of Mendes (fr. 1, p. 377 in Giannini (1966) = *FVS* vol. 2 no. 78 p. 251.22-4). Meineke indeed punctuated the text in a way that removes this implication, but it seems unnatural to do so. The text of Stephanus deserves to be quoted in full:

Ἀψυνθος . . . ἔστι καὶ εἶδος φυτοῦ, περὶ οὗ Βῶλος ὁ Δημοκρίτειος ὅτι Θεόφραστος ἐν τῷ περὶ φυτῶν ἐνάτῳ, τὰ πρόβατα τὰ ἐν τῷ Πόντῳ τὸ ἀψύνθιον νεμόμενα οὐκ ἔχει χολήν.

Apsynthos . . . it is also⁵⁰¹ a kind of plant, concerning which Bolus “the Democritean” (says) that Theophrastus in the ninth (book) *Concerning Plants* (says) “the sheep that graze on wormwood in Pontus do not have bile”.

Meineke punctuates with a full stop after Δημοκρίτειος, so that the sense will rather be ‘. . . concerning which Bolus “the Democritean” (writes. It is to be noted) that Theophrastus . . . says . . .’. Fraser however rejects Meineke’s punctuation (vol. 2, 637-8). This is the only place in Stephanus’ work where Bolus is mentioned by name, but this can be explained by supposing that Stephanus is drawing on an intermediate source; he refers to Theophrastus on three other occasions (**413** no. 87 above, **10** no. 14 = **11** no. 12, and **18** no. 1), but the contexts are very different and it is natural that mention of Theophrastus may have come to him by various routes.

Given the similarity of wording between Stephanus and Apollonius, if Bolus is indeed Stephanus’ source for Theophrastus it is likely that he is Apollonius’ source too here, and that has been the view of many scholars.⁵⁰² There are however difficulties. At least §§1-6 of

⁵⁰⁰ As is noted by Diels (1891) 393-4; Fraser (1972) vol. 2 637-8.

⁵⁰¹ As well as being the name of a city in Thrace.

⁵⁰² So Oder (1890) 75; Kroll (1942); Fraser (1972) vol. 2 638-9, cf. vol. 1 440. Hershbell argues that Stephanus knows Theophrastus through Bolus while Apollonius does so directly; but this is difficult to reconcile with the fact that Apollonius and Stephanus are verbally closer than either is to Theophrastus. For the influence of Theophrastus on Bolus cf. Fraser, vol. 1 440-4, vol. 2 p. 644 n. 547; Bolus is, incidentally, the next source cited after Theophrastus in the continuation of our **58** (Oder [1890] 75). The present reference probably comes from Bolus’ *On Marvels* (Suda s.v. ‘Bolos’, no. 482, vol. 1 p. 489.30 Adler), as Peter Kingsley points out to me. The attribution of other works by Bolus to Democritus is fortunately an issue we need not pursue here.

Apollonius' *Amazing Stories* appear to be attributed to Bolus.⁵⁰³ Apollonius, as Giannini notes, is rather conscientious about citing his sources; if our passage in §31 came from Bolus we would have to suppose either that all the citations of other sources by name in the intervening sections were taken over wholesale from Bolus by Apollonius,⁵⁰⁴ or else that Apollonius used Bolus intermittently, naming the ultimate sources of his material but not indicating that it sometimes came through Bolus and sometimes not.

A further difficulty is that Stephanus cites our passage explicitly as from *HP* 9, whereas Apollonius, who here gives no book number at all, elsewhere cites book 9 as book 8 and book 8 as book 7 (see on **413** nos. 109 and 89, respectively). If the Stephanus passage does come from Bolus and the book number has not been added by Stephanus, it is evidence for the existence of a numbering corresponding to ours, as well as one that did not, at a very early date (see above on **384** no. 1).⁵⁰⁵ But this means that Bolus gave a book number and Apollonius, even though he includes book numbers elsewhere, chose not to reproduce Bolus' number here. This might be because he was familiar with an eight-book *HP* and saw the reference to "book 9" as anomalous,⁵⁰⁶ though less than half of Apollonius' citations of *HP* include a book number anyway,⁵⁰⁷ and neither of the

⁵⁰³ The opening word of our text of Apollonius as now preserved is *Bôlou*, "of Bolus". Diels, loc. cit., argued that the *whole* of Apollonius' collection derived from Bolus, and is followed in this by Wellmann (1921) 9 and Fraser (1972) vol. 2 p. 638 (who says that the "basic substance" of Apollonius' work derives from Bolus). K. Ziegler, 'Paradoxographi', *RE* 18.3 (1949) 1137-66, at 1153-4, rejected both views, arguing that "of Bolus" related rather to preceding material now lost; he did not mention the parallel in §31. Giannini (1964) 123-4 n. 144 agrees that preceding material has been lost but holds that this is not incompatible with the reference to Bolus relating to §§1-6. These sections form a unit concerned with early "miracle-workers" (Epimenides, Aristeas, etc.; §6 is on Pythagoras); §7 is explicitly derived from [Aristotle] *Problems* (21.24 = 38.10), though reporting only the problem, not its solution. (Incidentally, the end of §6 is translated wrongly by Giannini; αὐτοῦ is not dependent on μεταγραφέων but means "here", so that the sense is "we, not wishing to play the rôle of (mere) copyists, will end our account (sc. of Pythagoras) at this point.") No sure conclusions can be drawn from the passage as to whether Apollonius is abandoning at this point not only the account of Pythagoras but his following of Bolus as a source.

⁵⁰⁴ The citation of Scymnus in §15 is problematic for this view if one accepts the customary dating of Bolus in the third century; but Fraser ([1972] vol. 1 440, cf. vol. 2 639) argues for a second century date for Bolus.

⁵⁰⁵ I am grateful to Peter Kingsley for pointing this out to me.

⁵⁰⁶ I owe this suggestion to Peter Kingsley, to whom and to Dirk Obbink I am grateful for discussion of this text.

⁵⁰⁷ Indeed book numbers, as opposed to titles, are relatively infrequent in Apollonius

two citations of book 9 between §§1-6 and §31 (§16 = **413** no. 109 (a); §29 = **413** no. 105) does so.

See also below on **417** no. 15.

109 *HP* 9.18.2] Apollonius, 16, 41; Aelian, 9.27

Regenbogen (1940) 1439. Preus (1988) 90.

Theophrastus, after referring to “a certain *akantha*” (here, according to Hort, gum arabic, *Acacia* spp.) and to *althaia* (marshmallow, *Althaea officinalis* L.), says that there is a second (*heteran*) kind—not making it clear of which plant—and that this second kind sets meat hard if cooked with it; Apollonius 16 (cited by Rose³ as fr. 270 of Aristotle, even though Aristotle is not named and Theophrastus is; but see above, n. 2) reports Theophrastus (naming *HP*, but giving no book number) rather as saying this of *thapsia*, *Thapsia garganica* L., “deadly carrot”, or “Spanish turpeth root” (Mabberley [1987] 576; cf. *HP* 9.8.3 and 9.20.3, and above on **355-8**; Scarborough [1978] 359, 382, [1992] 144 and 149), and adds that the meat cannot then be removed from the pot.⁵⁰⁸ Pliny, without citing Theophrastus, says the same of centaury (*Centaurea centaurium* L.⁵⁰⁹) at 25.67 and of *symphyton petraeum*, the “alum-plant” (comfrey, *Symphyton officinale* L.⁵¹⁰) at 27.42. Marsh-mallow can be used to make a kind of gum,⁵¹¹ and the resin

for any author. For the reader's convenience I give here a complete list of Apollonius' citations of Theophrastus by name. Not only Theophrastus' name but also a book title is given in every case except 34. 16 (**413** no. 109) = *HP* (9), no book number given; 29 (**413** no. 105) = *HP* (9), no book number given; 31 (**413** no. 108) = *HP* (9), no book number given; 32 (**413** no. 43) = *HP* (4), no book number given; 33 (**413** no. 89) = *HP*, cited as 7, our 8; 34 (**413** no. 93), “the same philosopher”, no further details given, similarly = our *HP* 8; 41 (**413** no. 109) = *HP*, cited as 8, our 9; 43 (**413** no. 16) = *HP* (2), no book number given; 46 (**417** no. 15) = *CP* 5, cited as such; 47 = **400B**; 48 (**413** no. 103) = *HP* (9), no book number given; 49 = **726A**; 50 (**413** no. 107) = *HP* (9), cited as “in the last book”.

⁵⁰⁸ Wimmer regarded this as a separate fragment (his 170) because of the extra detail.

⁵⁰⁹ Cf. J. André, *Pline l'Ancien* vol. 25, *CB* 1974, 118.

⁵¹⁰ Cf. A. Ernout, *Pline l'Ancien* vol. 27, *CB* 1959, 84. Comfrey has the effect of healing wounds because of the allantoin that it contains, and in the Middle Ages it was believed to mend broken bones; hence both the botanical name *Symphyton* and the popular name “comfrey”, from *conficere* or *confirmare*. Cf. Grieve (1931) 217-18, who cites the herbalist Nicholas Culpeper (1616-1654) for the same claim about cooked meat as Pliny, and in general L.D. Hills, *Comfrey*, London: Faber and Faber, 1976, especially 18-19.

⁵¹¹ Cf. Theophrastus *HP* 9.18.1 and Scarborough [1992] 148; but Theophrastus distinguishes the kind that allegedly sets meat from that described in 9.18.1.

of *Thapsia garganica* is used as an ingredient in plaster (Mabberley, loc. cit.). It may be that a reference to *thapsia* has dropped out of our text of *HP* and been preserved by Apollonius (so Regenbogen); but the reference to “a second kind” is then odd, unless indeed it refers back to *rhizai* in the first line of 9.18.1, ‘another kind of “root” or medicinal plant’.

Theophrastus next refers to “others”—presumably, as our text stands, other types of *akantha*, of marsh-mallow, or of “roots” or medicinal plants generally—which attract things in a similar way to magnets. Regenbogen however connects this passage with the next section in Apollonius, 17, where Ctesias is cited for the quasi-magnetic properties of the Indian bo-tree (*Ficus religiosa* L.), and suggests that Ctesias may be the source of *HP* 9.18.2 as well. This implies that our text of *HP* is defective.

Theophrastus goes on to say that *thêluphonon* (*Aconitum anthora* L.; cf. Hort [1916-26] vol. 2 p. 451 and Polunin [1980] 232), also called *skorpîos*, kills scorpions if shredded over them. Apollonius 41, citing this, reverses the order of the names of the plant and says that it *dries* the scorpions; similarly Aelian, saying that it withers them. (Apollonius cites the passage as from book 8; see above on **384** no. 1.)

- 110 *HP* 9.18.9] Athenaeus, 1.32 18d; Pliny, 26.99

Lloyd (1983) 146. Preus (1988) 89-90.

Theophrastus refers to a plant increasing sexual potency to a degree which he says “if true, is excessive”; as Lloyd notes, Pliny plays down Theophrastus’ expression of doubt so that he himself will seem more critical.⁵¹²

- 111 *HP* 9.18.10-11] Athenaeus, 1.57 31EF, 2.15 41F = **214A** lines 3-4
Preus (1988) 89-91.

Theophrastus refers to water at Thespia which makes women fertile and that at Pyrrha which makes women sterile. Athenaeus cites this in 2.15 41E = **214A**; the same statement also occurs at Theophrastus *CP* 2.6.4. Theophrastus next refers to wine in Arcadia which makes men mad and women infertile, giving the place as Herakleia;

⁵¹² This section of *Research on Plants* is omitted in Hort’s Loeb; presumably for reasons of seemliness, not because of doubts about its authenticity. Cf. Preus (1988) 96 n. 14.

Athenaeus 1.57 31EF reports this but names the place as Heraea, and so too, but without naming Theophrastus or specifying the place further than as in Arcadia, does Pliny 14.116. Finally Theophrastus refers to a vine whose wine causes humans to miscarry, while its grapes have the same effect on dogs; Athenaeus loc. cit. relates both the effect of the wine and that of the grapes to humans.

- 112 *HP* 9.19.2] Oribasius, *Medical Collection* 11A54, addition (*CMG* vol. 6.1.2 p. 89 ad 18)

Theophrastus reports as foolish the belief that anointing oneself with *antirrhizon* (so the MSS) is a charm to ensure fame. Stackhouse emended the text of Theophrastus to *antirrhinon* (snapdragon, *Antirrhinum maius* L.) on the basis of Dioscorides *De Materia Medica* 4.130, who says that such anointing produces beauty, and Pliny 25.129, who says that it produces both beauty and immunity to poisons. Neither Dioscorides nor Pliny names Theophrastus, and André (1955) 310 argues that Pliny is independent of Theophrastus here. The scholium to Oribasius expressly contrasts Theophrastus' *antirrhizon* and Galen's terms *amprinon* or *anarrhinon*;⁵¹³ but this may just show that it is based on a text of Theophrastus which was already corrupt.⁵¹⁴

- 114 *HP* 9.20.1] Athenaeus, 2.73 66E

This citation of *HP* on pepper and its use as an antidote for hemlock-poisoning is immediately followed in Athenaeus by **347A**, q.v.

- 115 *HP* 9.20.4] Galen, *Explanation of Hippocratic Expressions*, on *akonên* (vol. 19 p. 72.16-18 Kühn)

Galen cites (as book 8, see above on **384** no. 1) Theophrastus' reference to the use of an *akonê* in the medicinal preparation of ebony, claiming that *akonê* is here used in the sense of *thuia*, meaning by this *thueia*, mortar; Hort (1916-26) vol. 2 p. 317 gives *akonê* its usual sense of "whetstone". On the use of ebony here cf. Scarborough (1978) 383-4.

⁵¹³ In fact Galen, *On the Composition and Powers of Simple Drugs* 6.1.49, vol. 11 p. 834.1 Kühn, like Dioscorides, gives the alternatives as *antirrhinon* or *anarrhinon*. *Antirrhina* also at Galen, *Explanation of Hippocratic Expressions*, vol. 19 p. 82.12 Kühn.

⁵¹⁴ Cf. also Hesychius s.v. *antirrhinon*, (no. 5469, vol. 1 p. 189.11 Latte), who glosses *antirrhinon* as "*antirrhizon*. Others say, a type of herb."

EXPLANATIONS OF PLANTS

- 414** (dubious report concerning Theophrastus) Scholium on Lucian, *On Dancing* 5 (vol. 4 p. 143.9 and 24-5 Jacobitz, ed. 1836)

C. Jacobitz (ed.), *Lucianus*, Leipzig: Koehler, 1836-1841, vol. 2 p. 212; vol. 4 p. 143. H. Rabe, *Scholia in Lucianum*, *BT* 1906, p. 188. I. Sommerbrodt, *Lucianus*, vol. 2, Berlin: Weidmann, 1893, 258. A.M. Harmon, ed., *Lucian*, vol. 5, *LCL* 1936, 216-17 n. 2.

In Lucian's text a speaker says μή ὥρασιν . . . ἰκοίμην.⁵¹⁵ This might be rendered "may I not come in due season", but the *first* scholium in Jacobitz' 1836-1841 edition (vol. 4 p. 143.3-8), which is also in Rabe 188.3-8 and which is found in MSS as early as the 10th century, interprets it rather as meaning μή εἰς τοῦτον φθάσαι, "not to arrive at, or reach, the future", and complains that the accusative should have been used rather than the dative, this indeed being the point of the scholium. MS Γ (Vaticanus 90), followed by Harmon in the Loeb, indeed reads ὥρας, but Harmon renders this as "May I never reach ripeness of years".⁵¹⁶ Jacobitz himself emended the text of Lucian to ὥρασιν in the sense of "in good season", "may he not come in good season" being idiomatic for "bad luck to him" (Cf. LSJ s.v. ὥρασιν; Jacobitz vol. 2 p. 212.10 of his 1836-1841 edition; so vol. 2 p. 146.9 of his 1851 Teubner edition, and Sommerbrodt p. 130).

In Jacobitz there follows a *second* scholium (143.9-18), by someone who interpreted the text rather in the sense of "may I never get to heaven". The scholiast supported this interpretation by connections between the mythological Horai (Hours) and (the gates of) heaven, for which he cites Homer and Philostratus. A more recent hand has then added to this second scholium an (accurate) citation of a passage from the *Cypria*, in Athenaeus 15 682E, on Aphrodite wearing garments made by the Graces and the Horai, and at the end of this (143.24-5) the passing reference to Theophrastus which is in our text. The MS at Wolfenbüttel containing this second scholium and the addition, Jacobitz' G but Nilén's F, is however exceedingly late, called

⁵¹⁵ So MSS ΑΩΦ; ὥραις Vaticanus 87; ὥρας G, followed by Harmon. Cf. I. Sommerbrodt (ed.), *Lucianus*, Berlin: Weidmann, 1893, vol. 2.1 p. 258.

⁵¹⁶ The *genitive* ὥρας is used in the idiomatic expression "may he not come in due season" = "bad luck to him" (see below) by Menander, *Perikeiromenē* 321 Sandbach.

“recentissimus” by Jacobitz and dated to the 16th or 17th century by Steindl.⁵¹⁷

The phrase ὥρας ἄπτεται, which the scholium presents as a direct quotation, occurs nowhere in *CP* 4.⁵¹⁸ The reference might rather be to *On Causes* listed by Diogenes Laertius in 5.49 = 1.250 = **137** no. 9, if that is indeed a work distinct from *CP*; see the Commentary on **137** no. 9. However, Diogenes gives that work only one book; and at the late date of our scholium it is unlikely that significant information about lost Theophrastean works would be available. The origin of this report remains a mystery.

415 (Dubious report concerning Theophrastus) Scholium on Aratus’ *Weather-Signs* 1047 (p. 497.13-498.7 Martin)

Rose (1863) p. 251. Negbi (1989) 24.

Aratus (c.315-240/239 B.C.) wrote a didactic poem, the *Phaenomena*, the latter part of which deals with weather-signs. In the passage to which this scholium relates he says that a heavy crop from the Kermes-oak (*prinos*), *Quercus coccifera* L., foretells storm and sometimes drought, and that the three fruitings of the *schinos* indicate the times to sow and the expected size of crop. Similar claims about the *schinos* are made in [Theophrastus] *On Weather-Signs* 55.

Plutarch, in his treatise on Aratus’ poem, now lost, is reported by the scholium as citing Theophrastus as saying that the *prinos* and the *schinos* are drier than other trees and hence need watering if they are to bear much fruit; he then uses this to explain the use of the trees by farmers as indicators of moisture and hence of likely crops. What follows from line 3 onwards is presented as Plutarch’s explanation of Aratus, not as from Theophrastus himself. “Then” in the first sentence could be from Plutarch, but it could also indicate some rewording by the scholiast; in its present context in the scholium it picks up a paraphrase of the lemma from Aratus.

Abundant fruiting of the *prinos* is mentioned as a sign of stormy weather and sometimes drought, exactly as in Aratus, at [Theophrastus] *On Weather-Signs* 45 and 49. Cronin (1992) 326 notes that

⁵¹⁷ N. Nilén, *Lucianus*, *BT* 1906, vii; E. Steindl, *Luciani Scytharum colloquia*, *BT* 1970, x-xi. Hence its omission by Rabe.

⁵¹⁸ τῆς ὥρας ἀπολείπεσθαι at *CP* 4.11.1 is the emendation of Einarson and Link for μὴ ὥρα καταλείπεται of the principal MS (μηδεμία ὥρα ἐκλείπειν Schneider).

these references to the *prin*os, and that to the *schin*os in 55 already discussed, are the *only botanical* weather-signs in the pseudo-Theophrastus treatise, and does not assign them to either of the two sources (Aristotle and the genuine Theophrastus) which he argues the compiler used; the implication is that they were added by the compiler himself (and see below, n. 521). But the *explanation* in terms of the tree's dry nature is not given in the pseudo-Theophrastus treatise or anywhere in Theophrastus' surviving works.⁵¹⁹

The term *schinos* is ambiguous, meaning either the mastich (*Pistacia lentiscus* L.) or a plant like the squill, perhaps the pine-thistle, *Atractylis gummifera* L. (see below on 417 no. 14). Hort (1916-26) vol. 2 p. 431 translates *schinos* in *On Weather-Signs* 55 as "mastich". But as Hort notes Theophrastus in *HP* 7.13.6 speaks of the three flowerings of the squill (*skilla*, *Urginea maritima* (L.) Baker) as indicating the times to sow and size of crop,⁵²⁰ and Negbi 24 notes that the spring flowering of the mastich is not at the appropriate time for sowing in the Mediterranean. It therefore seems likely that *schinos* means a squill-like plant both in *On Weather-Signs* and in the Aratus passage.⁵²¹ However, both *On Weather Signs*, as Negbi points out, and Aratus speak of *fruiting* where *HP* speaks of flowering, so the confusion may already have begun.⁵²² From the way in which Plutarch's comment is expressed it seems highly probable that *he* at least interprets Aratus' *schinos* as the mastich.

416 (dubious report concerning Theophrastus) Albert the Great, *On Vegetables* 2.1.1.15 (p. 108.30-109.5 Jessen)

For Albert see above on 354. Jessen interprets the form of this report, "they say", as showing that Albert is not speaking from first-

⁵¹⁹ At *CP* 5.6.10 Theophrastus says that the *schinos* is *moist*; but the reference there is not to the mastich but to the pine-thistle (see below).

⁵²⁰ The squill in fact flowers only once, from July to October, but the long period may have given the impression of multiple flowerings; J. André, cited in H. Le Bonnière and A. L. Boeufle, *Pline l'ancien* vol. 18, *LCL* 1972, 277. The three flowerings of the squill appear also, without mention of Theophrastus' name, in the *Geoponica* (11.12.2, p. 333.11-14 Beckh)—oddly enough, immediately before a reference to the willow producing sterility, elsewhere linked with Theophrastus (see above on 411).

⁵²¹ This may be so even though Cronin (1992) 336 n. 38 uses the mention of *schinos* rather than *skilla* as an argument for the non-Theophrastean authorship of our present *On Weather-Signs*.

⁵²² Aratus himself goes on to speak of the three flowerings of the *skilla* as a sign of the size of harvest in the same way as the *schinos*, at *Phainomena* 1060; cf. also, of the *scilla*, Pliny 18.244.

hand knowledge; and this is indeed the only place in *On Vegetables* where he actually names Theophrastus. However, the form of Albert's report could be explained by his wishing to stress the fact that certain people (introduced in §14 only as *quidam* who say that plants grow continually) had appealed to Pliny and Theophrastus in support of their argument, and in that case no conclusions can be drawn from it as to whether Albert had direct knowledge of Theophrastus or not. That plants produce no residues because concoction of nourishment takes place in the earth outside the plant, not within it as is the case with animals, is argued by Aristotle at *PA* 2.3 650a22, 2.10 655b32-6, 4.5 681a32-4, *HA* 4.6 531b8-10; cf. Theophrastus *CP* 6.10.3, 6.11.5; 6.17.9; [Aristotle] *On Plants* 1.2 817b19; G.R. Thompson (1941) 276; Einarson-Link (1976-90) vol. iii p. 311 n. 2, 330-1 nn. See however below, p. 147

- 417** Passages in Theophrastus' work *Explanations of Plants* to which later authors refer mentioning Theophrastus by name.

See the introductory note to **413**.

- 4 *CP* 1.19.4] Pliny, *Natural History* 15.10

Theophrastus does say that olive oil is produced by warmth, but does not add, as does Pliny, the further point that fires are therefore lit to warm olive-presses and cellars. But it is not clear that Pliny wishes to suggest that this further information derives from Theophrastus.

- 5 *CP* 2.6.4] Athenaeus, 2.15 41F = **214A**

See above on **413** no. 111.

- 6 *CP* 2.10.2] Athenaeus, 3.13 77F

See above on **393**.

- 8 *CP* 2.17.5 and 8] Aelian, 9.37

Aristotle fr. 275 Rose³. Regenbogen (1940) 1438.

Aelian mentions trees growing on other trees, while the *CP* passages relate to mistletoe specifically. Wimmer treated this text as an independent fragment, his 169 (but with the reference misprinted as 9.27; so too in Regenbogen and, regrettably, in the first impression of our own concordance, text and translation vol. 2, 620-1). Rose included

the passage in his collection of the fragments of *Aristotle*, even though Aelian names Theophrastus rather than Aristotle; see above, n. 2. However, Regenbogen rightly argues that the passage in Aelian is merely a “stylised paraphrase” of that in *CP*. Similarly, without naming a source, Theophrastus, Pliny 17.99.

9 *CP* 3.9.3] *Geoponica* 3.3.4

Rose (1863) pp. 272-3. Gemoll (1884) 60-2. Oder (1890) 64 n. 2.

The *Geoponica* cites Aristotle (= fr. 277 Rose³) as recommending pigs' manure for the roots of almond trees, and Theophrastus as recommending pouring urine on the roots. In fact Theophrastus in *CP* 3.9.3 recommends pigs' manure for pomegranates and almonds, urine for myrtles. Strong manure is recommended for olive, myrtle and pomegranate at *HP* 2.7.3 (see above on **396**). Pigs' manure is also recommended for the pomegranate at *HP* 2.2.11, where the almond is improved rather by driving in a peg and letting the gum exude.⁵²³ Gemoll argues that the citation of Aristotle in the *Geoponica* is an error derived from a passage of Gargilius Martialis, in whom the driving of a peg into the almond is followed first by the recommendation of pigs' manure for making almonds sweet and then by the attribution of bitterness in almonds to the heat of the sun.⁵²⁴ It is for the last-mentioned point that Gargilius cites “Aristotle in his work on farming”; Gemoll argues that Aristotle's name was erroneously transferred to what precedes and that this is reflected in the report in the *Geoponica*. The *Geoponica* describes the material as “from Varro and the Quintilii” (the latter being the consuls of 151 A.D.; cf. Christ-Schmid-Stählin [1920] 291), i.e. (Rose) from the latter citing the former; the reference is in the heading to 3.1 (p. 87.2-3 Beckh) but is clearly intended to apply to what follows as well. However, see above on **383**.

14 *CP* 5.6.10] scholium on Aristophanes' *Wealth* 720⁵²⁵

F.H.M. Blaydes, ed., *Aristophanis Plutus*, Halle: in Orphanotrophei libraria, 1886, p. 287. B.B. Rogers, ed., *The Plutus of Aristophanes*,

⁵²³ Similarly, of both pomegranate and almond, [Aristotle] *On Plants* 1.7 821a36.

⁵²⁴ Gargilius Martialis, *On Gardens* 3, p. 114.244-50 Mazzini (Bologna: Pàtron, 1978; 246-50 = Aristotle fr. 278 Rose³).

⁵²⁵ I am grateful to Professor Moshe Negbi for discussion of the issues raised by this passage.

London: George Bell, 1907, p. 80. Scholia on Aristophanes, *Plutus* 720, vol. 4 p. 235 ed. Dindorf, Oxford: e typographeo academico, 1838. John Tzetzes, *Scholia in Aristophanem* pars 4, *Johannis Tzetzae commentaria in Aristotelem*, fasc. 1, ed. L.M. Positano, Groningen: Wolters, 1960, 165-6. Negbi (1989) 23-4. Einarson-Link (1976-90) vol. 3 73, 97.

Aristophanes refers to *schinos* as an ingredient, along with garlic, fig-juice (a notable irritant) and vinegar, in a deliberately painful ointment. *Schinos* is used both for the mastich shrub (*Pistacia lentiscus* L.) and for a plant resembling the squill.⁵²⁶ The squill, or sea-squill⁵²⁷ is a bulbous plant of the lily family; it is an emetic, its juice irritates the skin, and the raw bulb contains crystals of calcium oxalate which add to the irritation.⁵²⁸ Extracts from the plant were used to sharpen vinegar according to Pliny 19.30, and were used in antiquity, and have been used in modern times, as a medicine for certain forms of dropsy.⁵²⁹ Dioscorides refers to its use for chronic coughs, as does Pliny.⁵³⁰ Its main medical use in modern times however is in the treatment of dropsy and heart-disease.

Blaydes and Rogers both take it that it is the squill that is meant in the Aristophanes passage, though since the stickiness of mastic might be appropriate for an ointment, it is perhaps difficult to be

⁵²⁶ Galen, *Explanation of Hippocratic Expressions* (vol. 19 p. 145.3-4 Kühn) has "*schinos*: not only a bulb, but a kind of *skilla*, or the bulb of any *skilla*". Aristophanes (fr. 255 Edmonds) refers to the use of *schinos* to keep off evil spirits, a known use of squill (HP 7.13.4; Pliny 20.101; Dioscorides 2.171.4. For its purificatory uses cf. also Theophrastus *Characters* 16.14 and Scarborough (1992) 146-7, who suggests that in HP 7.13.4 Theophrastus is *explaining* the apotropaic use of squill by its preservative effects on other plants, for which see below. The connection is not however made explicit). Hippocrates, in the well-known passage about the treatment of hysteria by external applications to persuade the womb back to its place, says that pounded *schinos* should be applied to the nose to produce a *biting* effect; probably he too has squill in mind. (Hippocrates, *Diseases of Women* 2.201, vol. 8 p. 384.8 Littré.) See also above on 415.

⁵²⁷ "sea-onion", *skilla*, *Scilla maritima* L. = *Urginea maritima* Baker = *Urginea scilla* Steinheil; as opposed to *Scilla bifolia* L. (identified by Hort as Theophrastus' *huakinthos agria*) or *Scilla autumnalis* L. (identified with *tiphaon*).

⁵²⁸ Grieve (1931) 766-9.

⁵²⁹ Riddle (1985) 239 n. 213 cites J. Stannard, 'Squill in the ancient and medieval Materia Medica with special reference to its employment for dropsy', *Bulletin of the New York Academy of Medicine* 50, 2 ser. (1974) 684-713.

⁵³⁰ Dioscorides 2.171.3; Pliny 20.100. Cf. Scarborough (1992) 170 n. 132. At 19.94 Pliny says that Pythagoras wrote a whole book on squill "collecting medical properties which we will report in the next book". This may explain Grieve's statement that squill has been "used as cough mixture since Pythagoras"; but in 20 itself Pliny cites Pythagoras only for the use of squill to ward off evil spells (20.101). Cf. Riddle (1985) 86.

certain. Mastic is of course chewed to sweeten the breath; it is also used for filling teeth and as an ingredient in varnish,⁵³¹ and as an *astringent* to arrest bleeding.⁵³² The “galls” are described as an astringent used for sore mouths in a modern Indian herbal.⁵³³ But in any case what primarily concerns us is not what Aristophanes himself intended, but what the subsequent tradition made of the passage.

Theophrastus in *CP* 5.6.10 refers to the planting of cuttings in the bulbs of *skilla* or *schinos* to provide warmth and moisture. It seems that he too has a squill-like plant rather than the mastich in mind here. Setting cuttings in a squill (*skilla*)-bulb is also mentioned at *HP* 2.5.5 (= **413** no. 18) and 7.13.4,⁵³⁴ and Pliny 17.87; and planting things in a *schinos* at *CP* 5.9.5. Planting fig-trees in squills was prohibited by Jewish law, according to Negbi (1989) 24; he mentions the possibility that the bulb may supply the cutting not only with moisture but also with rooting hormones. Amigues (1988) p. 129 n. 10 comments that the squill-juice is poisonous to insects and so would protect the root from them.

Einarson and Link identify Theophrastus' *schinos* in *CP* 5.9.5 and 5.6.10 as the pine-thistle, *Atractylis gummifera* L., which has a bulb-like organ in which cuttings could be planted.⁵³⁵ The pine-thistle is also known to Theophrastus as *ixinê* (of which more later) and as “white chameleon”; various alleged medical and poisonous effects of the plant are described under the latter name at *HP* 9.12.1 (on which cf. Scarborough [1978] 369-70). Nothing is said there about its having the *irritant* properties of squill.⁵³⁶ But even if it is not the pine-thistle that is meant by Aristophanes when *he* refers to *schinos*, there is no reason why the same word should not be used loosely for different plants which have in common their possession of a large bulb-like structure.⁵³⁷

The scholium on Aristophanes deserves quotation in full:

⁵³¹ Grieve (1931) 522. Also, to treat diarrhoea.

⁵³² Riddle (1985) 54 and n. 91, citing W.H. Lewis and M.P.F. Elvin-Lewis, *Medical Botany*, New York: Wiley, 1977, 341.

⁵³³ Nadharni (1976), above n. 474, 973-4.

⁵³⁴ Cf. above, n. 526, and Scarborough (1992) 146.

⁵³⁵ I am grateful to Eva Henze for confirming this.

⁵³⁶ Dioscorides, *De materia medica* 3.8.1 refers to the use of “white chameleon” for dropsy, being a diuretic like the squill. On the identification cf. Riddle (1985) 79-81.

⁵³⁷ The use of *schinos* for both pine-thistle and mastich-shrub may indeed not be fortuitous. The pine-thistle shares with the mastich-shrub the feature of exuding gum. It was and still is used as a substitute for or adulterant of mastic (Mabberley [1987] 52). Dioscorides, *De materia medica* 3.8.1, says that “white chameleon” produces gum and is for that reason called by some *ixia*. And the pine-thistle is cited,

καὶ σχίνον· σχίνον νῦν φησι τὴν σκίλλαν· δηκτικὰ γὰρ βούλεται πάντα εἶναι.
ἐν δὲ τοῖς ἐξῆς παράκειται καὶ ἐκ τῶν Θεοφράστου, ὅτι ἕτερόν τι ἡ σκίλλα καὶ
ἡ σχίνος. παρὰ τὸ σχίζεσθαι καὶ δακρύειν· ἡ αὐτὴ γὰρ τῇ μαστίχῃ.

And *schinos*: by *schinos* he here means the squill, for he wants all (these) to be biting. In what follows it is also mentioned from the (writings) of Theophrastus that the squill and the *schinos* are something different. (The name) derives from being split and weeping; for it is the same as the mastich.

The scholium begins by identifying *schinos* and *skilla*, but then cites an already existing comment (*en de tois hexês*) as saying that Theophrastus regards the *schinos* and *skilla* as different. If what that earlier scholiast had in mind was that Theophrastus recognises the difference between squill and *schinos* in the sense of *mastich-shrub*, this is true; but there is no single passage where he makes this distinction, and in particular it would be wrong to suppose that CP 5.6.10 is distinguishing between squill and mastich-shrub. In the final sentence, at least, of the scholium in its present form it is clear that *schinos* is understood as referring to the mastich-shrub.⁵³⁸ Tzetzes goes further in explicitly *rejecting* the interpretation of *schinos* as something like the squill.⁵³⁹

15 CP 5.15.1] Apollonius 46

Wellmann (1921) 9-11. Giannini (1966) 141.

The point in Apollonius which *does* derive from Theophrastus' CP, the drying effect that bean-pods placed around the roots have on

as a spiny plant under the name of *ixinê*, as a source of gum (*mastichê*) at HP 9.1.2, along with *schinos* in the sense of the mastich-shrub. At HP 6.4.9 the gum from the pine-thistle is called "thorn-mastich", *akanthikê mastichê*. (Wellmann [1921] indeed employs the use of "white chameleon" at 9.12.1 and *ixinê* at 6.4.9 for the same plant as an argument against the authenticity of HP 9.)

⁵³⁸ Scholia in other MSS cited by Dindorf have "*schinos*: instead of mastich-shrub", "the tips [*akra*] of the squill, or the mastich-shrub", "the tips of the squill", "*schinos*, i.e. squill", and "*schinos* is the tree [i.e. the mastich-shrub], *schoinos* [= rush, reed, or rope] is *brulon* [an unknown word, apparently], with the diphthong *oi*." *schinos* and *schoinos* are confused elsewhere, as Alan Griffiths points out to me; the last comment is clearly trying to sort out the confusion, correctly as far as it goes.

⁵³⁹ *Scholia in Aristophanem* pars 4, *Johannis Tzetzae commentaria in Aristotelem*, fasc. 1, ed. L.M. Positano, Groningen 1960, 165-6: "*schinos*: from being split and weeping, for it is the same as the mastich-shrub. All these things are biting and strong-smelling . . . It is in error that some people think that the *schinos* is the squill; for the squill is a thing like an onion, but the *schinos* is a tree from which mastic [*mastichê*, the gum itself] comes, (and it is also used) wrongly for the mastic itself. All these things are biting and pungent."

plants, also appears, without Theophrastus being named, at *Geoponica* 2.35.1, as Giannini notes. Wellmann argued that the common source of Apollonius and the *Geoponica* here was Bolus; see above on **413** n. 108. Apollonius here cites *CP* explicitly with the book number 5.

- 16 *CP* 6.1.2,6.4.1] Galen, *On the Constitution and Powers of Simple Drugs* 1.38 (vol. 11 p. 451.11K)

Sharples (1985) 185-6. Sedley (1985) 205.

The number of flavours is also given as eight, without Theophrastus being cited by name, by Plutarch *Natural Explanations* 913AB.

- 21 *CP* 6.10.2] Aelian 9.64⁵⁴⁰

H. Diels, 'Aristotelica (II)', *Hermes* 40 (1905) 310-16. Steinmetz (1964) 296 n. 6.

Aelian reports Aristotle (*HA* 8.2 590a18), Democritus (*FVS* 68a155a), Theophrastus and Empedocles (*FVS* 31A66) as saying that there is in the sea fresh water by which fish are nourished. Diels claimed for Theophrastus also the experiment in *HA* 8.2 590a18 of lowering into the sea a wax vessel which will allegedly fill with fresh water, which is cited by Aelian as from Aristotle.

- 22 *CP* 6.14.8] Plutarch, *Alexander* 4.5-6, etc.

A.E. Wardman, 'Plutarch and Alexander', *CQ* 5 (1955) 96-107, at 102. J.R. Hamilton, *Plutarch, Alexander: A Commentary*, Oxford: Clarendon Press, 1969, 12. N.G.L. Hammond, *Sources for Alexander the Great*, Cambridge: Cambridge University Press, 1993, 164.

For the connection between fragrant plants and hot places cf. *CP* 6.18.3 and [Aristotle] *Problems* 12.3 906b12ff., 13.4 908a13ff. Flashar (1962) 553, 557; Sharples (1985) 196. The reference to *CP* 6.14.8, and the fact that the connection with Alexander is due to Plutarch himself, are rightly noted by Hamilton.

⁵⁴⁰ There is an error on p. 237 in the first printing of our text and translation volume; the Theophrastus reference should be 6.10.2, as on p. 236.

FLAVOURS

- 418-424** Stratton (1917) 43-5. Sharples (1985) 185-193. Einarson-Link (1976-90) vol. 3 200-326

Theophrastus' surviving discussion of flavour is chiefly in *CP* 6, where flavour is defined as "the mixture of the dry and earthy with the moist, or the infusion of the dry through the moist by heat".⁵⁴¹ He distinguishes⁵⁴² eight varieties of flavour, *glukus* (sweet), *liparos* (rich or oily), *austêros* (harsh, rough), *struphnos* (sour), *drimus* (pungent), *halmuros* (salty), *pikros* (bitter) and *oxus* (sharp, acid), though observing that the number seven is "most appropriate and natural"⁵⁴³ and proposing to identify *pikros* and *halmuros*. The *oinôdês* (wine-like) flavour is mentioned as not easy to subsume under any other, but is not in the event treated as distinct. The basic classification, without *oinôdês*, is found in Aristotle, *On Sensation* 4 442a17 and *On the Soul* 2.10 442b10, in the former with the suggestion that *glukus* and *liparos*, or *pikros* and *halmuros*, are to be identified, thus reducing the number to seven; in Aristotle's *On the Soul*, however, we are simply told that these pairs are adjacent, and there is no attempt to eliminate one of the flavours.⁵⁴⁴ Theophrastus differs from Aristotle in not presenting sweet and bitter as extremes with the other flavours intermediate between them; see below on **422**. He criticises earlier philosophers' treatments of flavour at *On Sensation* 65-72 and *CP* 6.1-2 (Democritus) and at *On Sensation* 84-9 (Plato); in *CP* he criticises Democritus, by contrast with Plato, for explaining flavour in terms of the shapes of the particles that cause it rather than by their effects on the sense-organs.

- 418** Galen, *Against Lycus* 4.6-7 (*CMG* vol. 5.10.3 p. 15.11-20 Wenkebach) art. 'Lykos (52)', *RE* 13.2 (1927) 2408-17 (E. Kind), at 2412-13.

Lycus (no. (52) in *RE*, see above) was a second-century A.D. commentator on Hippocrates whose interpretations were attacked by

⁵⁴¹ 6.1.1. Cf. Aristotle *On Sensation* 4 441b15-19; Einarson-Link (1976-90) vol. 3 202-3 n. 2.

⁵⁴² *Plant Explanations* 6.4.1, cf. 6.1.2.

⁵⁴³ On this cf. E. Zeller, *Die Philosophie der Griechen* 2.2³, Leipzig: Fues, 1879, 811 n. 1; Sedley (1985) 205.

⁵⁴⁴ In Plato, *Timaeus* 65b-66c, the same list appears but without *liparos*. Theophrastus' list is compared with Plato's by Galen and Oribasius, above **417** no. 16.

Galen—characteristically—for being insufficiently philosophical. In particular, Lycus had criticised the Hippocratic claim that growing things have more innate heat, and Galen in turn attacks Lycus for not recognising different types of heat. The type and manner of the objection are characteristic for Galen (see on **336** and on **430**); and the passages in **128** (app. crit.) and **129A** come from this argument. In the present passage Galen similarly criticises Lycus' view that flavours are undifferentiated *qua* moist, arguing that in that case Theophrastus' treatise *On Flavour* (= **384** no. 3) would have been redundant. Flavour is indeed itself a differentiation of the moist (see above), but is again further differentiated. For the translation of *chulos* see on **384** no. 3 and on **419**.

- 419** Galen, *On the Composition and Powers of Simple Drugs* 1.28 (vol. 11 p. 449.15-450.3 Kühn)

G.R. Thompson (1941) 219-21. Steinmetz (1964) 253f. Sharples (1985) 184.

Galen attributes to the Peripatetics—mentioning Theophrastus before Aristotle—a distinction between *chumos* as “flavour” and *chulos* as “juice”; earlier writers, he says, had used *chumos* for both. Theophrastus' definition of flavour (above on **418-424**) indicates that flavour and juice will naturally be found together in his view.⁵⁴⁵ However, it seems, as Thompson and Steinmetz argue, that Theophrastus did observe the distinction of terminology in the way Galen indicates, at least where plant juices are concerned.⁵⁴⁶ For the Hellenistic medical writer Mnesitheus see K. Deichgräber, art. ‘Mnesitheus (3)’ in *RE* 15.2 (1932) 2281-4; W. Jaeger, ‘Vergessene Fragmente des Peripatetikers Diokles von Karystos’, *Abh. Berlin*, phil.-hist. Kl. (1938) no. 3, at 40-6; Bertier (1972). Our text is Mnesitheus fr. 14 Bertier (1972). As often, “the associates of” (*hoi peri*) may mean just the individuals named.⁵⁴⁷

⁵⁴⁵ It is for this reason that we have translated *chuloi* by “flavours” rather than “juices” in **384** no. 3 and in **419**; the modern reader may not so naturally regard “flavour” as the primary association of “juice”.

⁵⁴⁶ *chumos* is the reading of A in *On Sweating* §13 p. 405. 25, 28 Wimmer (I owe this information to Bill Fortenbaugh); see also E.S. Forster in *Class. quart.* 27 (1933) 141. LSJ is wrong to gloss *chumos* at *HP* 9.1.1 as “juice”, and to say that Galen's distinction in our present passage is between *flavour* and juice, rather than taste and juice.

⁵⁴⁷ I am grateful to Vivian Nutton for pointing this out here, and for the reference in the preceding sentence.

- 420** Galen, *On the Composition and Powers of Simple Drugs* 1.39 (vol. 11 p. 453.4-8 Kühn)

Sharples (1985) 186.

Galen reports that Theophrastus does not speak of an astringent, *stuphon* taste. He himself regards this as the common genus of harsh (*austēros*) and sour (*struphnos*).⁵⁴⁸ Galen's statement is correct as far as our extant texts go, and is perhaps not surprising in that Theophrastus links sourness with relative dryness (*CP* 6.6.5) and harshness with relative moisture (*CP* 6.11.1). Theophrastus does however use the verb *stuphein* at *On Odours* 60, and *apostuphein* at *On Odours* 36.

- 421** (inaccurate report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 4.4 (vol. 11 p. 633.5-13 Kühn)

G.R. Thompson (1941) 263. Sharples (1985) 186-7.

Galen lists a variety of "sweet" or "watery" tastes, and says that Theophrastus asked whether there are several kinds of sweet taste or whether they differ in degree. Theophrastus speaks of various flavours, including the sweet, each having several varieties, at *CP* 6.9.2, to which Thompson refers this passage;⁵⁴⁹ he does not there give the examples listed by Galen here, reeds, dog's-tooth-grass (Bermuda grass, *Cynodon dactylon* L.), wheat, barley and "rice-wheat" (emmer, *Triticum dicoccum*), but it is not clear that Galen wishes to suggest that these specific examples come from Theophrastus. Theophrastus does not in *CP* 6.9.2 present difference in kind and difference in degree as exclusive alternatives; rather, he says that the varieties of a given flavour may differ in degree, but most strictly differ by the mixture of the underlying substances. The claim that difference in degree can amount to difference in kind is one of general importance for Theophrastus; cf. above n. 395, **438**, and Aristotle, *Nicomachean Ethics* 8.1 1155b13-15. Groups of flavours of the same kind differing in degree are mentioned at *CP* 6.3.5; cf. also 6.12.3, 6.13.2.

⁵⁴⁸ Galen, *On the Faculties of Foodstuffs* (*De alimentorum facultatibus*) 1.1.39 (CMG vol. 5.4.2 p. 513.25-6; cf. Plato, *Timaeus* 65cd and Galen, *On the Composition and Powers of Simple Drugs* 1.38 p. 450.16-451.4 Kühn.

⁵⁴⁹ At *CP* 6.4.2 the "milk-like" taste is mentioned as a variety of the sweet.

- 422** (inaccurate report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 4.18 (vol. 11 p. 679.9-16 Kühn)

Einarson-Link (1976-90) vol. 3 463. Sharples (1985) 187. Sedley (1985) 206-7.

Galen cites Theophrastus among others as holding that the pungent (*drimus*) taste is the hottest of all. Theophrastus mentions in passing at *CP* 4.3.3 that pungent plants are hot, but is not there comparing the pungent taste with other tastes as such. Einarson-Link suggest that this text may derive from Theophrastus *On Wine and Olive-Oil*. Sedley, however, notes that at *CP* 6.3.1 Theophrastus speaks of the pungent taste as hot, not in stating his own view, but simply in giving one of a series of hypothetical examples of how one might explain different tastes in terms of their physical effects on the sense-organ, rather than with Democritus in terms of the physical constitution of the thing tasted; Galen, Sedley suggests, may misleadingly be citing this as if it were Theophrastus' own view. Geoffrey Lloyd has pointed out to me that at Aristotle *On the Soul* 2.10 422b10ff. and *On Sensation* 4 442a17ff. pungent (*drimu*) is a middle and bitter (*pikron*) an extreme, though not indeed in point of *heat*. Theophrastus however seems deliberately not to follow Aristotle in treating sweet and bitter as extremes; cf. Einarson-Link (1976-90) vol. 3 204-5 n. 2, on *CP* 6.1.3.

In line 3. Kühn prints *energeia* ("actuality") in the Greek, but has *evidentia* in the Latin translation, which suggests rather *enargeia* "clarity". The two words are often confused,⁵⁵⁰ but *enargeia* gives the better sense.

- 423** (inaccurate report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 2.17 (vol. 11 p. 503.13-504.4 Kühn)

G.R. Thompson (1941) 251 n. 95. Sharples (1985) 192-3.

Galen explains the pungency of new olive-oil by the presence of a double residue in plant juices, an earthy and a watery; the first settles out and the second is concocted. He cites Theophrastus for the existence of this double residue. Theophrastus in *CP* 6.7.4 speaks of flavours becoming stronger as the watery part evaporates and the earthy part settles,⁵⁵¹ but does not there call them *residues*; indeed at *CP* 6.10.3,

⁵⁵⁰ Cf., for example, **301A** line 30.

⁵⁵¹ Similarly of the developing fragrance of wine at *CP* 6.16.6. At 6.14.3 large

6.11.5 and 6.17.9 he seems to endorse Aristotle's view that there are no residues in plants, which as it were use the earth as a stomach.⁵⁵² But this may only be a relative contrast between plants and animals, and elsewhere Theophrastus does speak of residues in plants as well (*CP* 6.6.8, 6.12.5). So Galen's account seems true to the spirit of what Theophrastus says, even if not to the letter.

- 424** (inaccurate report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 4.7 (vol. 11 p. 636.16-638.9 Kühn) Regenbogen (1940) 1442. Sharples (1985) 188-191. Einarson-Link (1976-90) vol. 3 268, 461.

Galen cites Theophrastus as saying that (i) tree-fruits are at first dry and sour, each in accordance with the nature of the tree that produced it. He then says that (ii) they become first moist and sharp, and then ripe and sweet, though some like olives omit the intermediate stage; and also that (iii) the ripening is caused by innate and external heat. He then cites Theophrastus again for (iv) the initial dryness and sourness, relating this to the time when the fruits are still "woody" (*xulôdeis*), and infers from this that (v) the sourness is connected with earth, the sharpness with moisture, citing Plato in the *Timaeus* for the former point.

The initial dryness and sourness in (i) and (iv) are indeed mentioned by Theophrastus, at *CP* 6.6.5. He does not there use the word "woody"; it is not clear whether Galen in (iv) intends to attribute it to Theophrastus, but his expression does rather suggest so. The list of trees given by Galen in (i) does not occur in this passage of *CP*, but it is not clear that Galen intends to imply that it does. That fruits in particular have a distinctive flavour for each type of tree is asserted (again, without the list of examples) by Theophrastus at *HP* 1.12.2, though here it is when the fruit ripens that the distinctive flavour is apparent.⁵⁵³ At *CP* 6.6.3 Theophrastus speaks of the olive as at first bitter with some sourness, and of the grape as first sour, then sharp, then sweet; this corresponds to (ii) in that the olive passes through two stages, the grape through three, though the details about

flowers are less fragrant than small because they have more earthy matter and more moisture.

⁵⁵² Above, p. 187. cf. however [Aristotle] *Problems* 13.4.

⁵⁵³ I am grateful to Jim Lennox for drawing my attention to this passage.

the olive are different (Galen says it passes from sourness to sweetness, Theophrastus that it changes from bitter to sour) and the three-stage process is not presented as the norm to which others are exceptions. The operation of the two forms of heat in (iii) is mentioned at *CP* 6.7.1; and the continued ripening of fruit after its removal from the tree at *CP* 2.8.2-3,⁵⁵⁴ 6.7.4, 6.14.10.

What we have in this passage of Galen, therefore, is an account which presents essentially Theophrastean doctrine throughout, but in Galen's own words and arrangement, and with not every detail corresponding to the Theophrastean texts.⁵⁵⁵ Moreover, Galen is utilising Theophrastus—and Plato—to develop his own argument. Whereas Theophrastus is concerned to analyse the stages of maturation of different types of fruit, Galen's actual concern is to establish correlations between the different flavours and the primary opposites hot, cold, moist and dry. The link between sourness and dryness is common to both writers, but the connections drawn by Galen between sweetness and heat and between sharpness and moisture are only implicit in *CP* 6.6, though sharpness and moisture are explicitly linked elsewhere.⁵⁵⁶

Regenbogen and Einarson-Link describe our passage of Galen as deriving from *CP*; that is true, but we have printed the text *in extenso* to make clear in exactly what way it is true. Regenbogen makes the general comment that Galen's quotations of Theophrastus on these topics are so free that they cannot be used to restore the text of Theophrastus. Einarson-Link 461 suggest that Galen may be following an intermediate source who paraphrased Theophrastus; but this does not seem a necessary supposition—Galen's own readiness to make free use of his own reading of Theophrastus may be sufficient explanation.

WINE AND OLIVE-OIL

See above, on **384** no. 2, and on wine in ethical contexts see below, **569-579**.

⁵⁵⁴ Cf. Gottschalk (1961) 74.

⁵⁵⁵ Galen does after all, as Vivian Nutton points out to me, qualify his report by "somewhere" (*pou*, line 3).

⁵⁵⁶ In *CP* 6.11.1.

- 425** Galen, *On the Composition and Powers of Simple Drugs* 4.11 (vol. 11 p. 654.4-10 Kühn)

Rose (1863) p. 232 no. 15 (208). Sharples (1985) 192. Einarson-Link vol. 3 (1976-90) 462-3.

Theophrastus at *CP* 6.7.1 and 6.7.4 refers to the role of internal heat in producing flavour (see above on **424**), but not in these passages specifically to heat *from the sun* being stored up in the fruit, to the concoction of a half-concocted watery element or to the case of grapes in particular. As with **424**, Galen is constructing his own account from Theophrastean materials. Einarson-Link regard the present passage as coming from *On Wine and Olive-Oil* (= **384** no. 2f), and derive its sequel in Galen, referring to the heat producing effervescence in the juice,⁵⁵⁷ from this source as well. Rose, who included our passage in his collection of Aristotelian fragments (fr. 226 Rose³; see above, n. 2), also included this sequel.

- 426** Galen, *On the Composition and Powers of Simple Drugs* 4.3 (vol. 11 p. 628.15-630.12 Kühn)

Rose (1863) p. 228 no. 11(204). Sharples (1985) 192. Einarson-Link (1976-90) vol. 3 462.

Galen cites Aristotle and Theophrastus for the view that vinegar has lost the natural heat of wine but has that due to corruption. This does not occur in the extant text of Theophrastus; the changing of wine into vinegar is mentioned at *CP* 6.7.5-6, but without this specific point. No doubt it was discussed by Theophrastus in *On Wine and Olive-Oil* (= **384** no. 2f); so Einarson-Link. The parallel description of the production of lye (caustic soda, sodium hydroxide) by straining water through ashes is invoked by Galen to argue that vinegar, the exact manner of the production of which we cannot observe, may be a compound just as lye is clearly shown to be by the way in which it is produced; the account of lye is not attributed to Theophrastus by Galen, but both Theophrastus (*CP* 6.3.2) and Aristotle⁵⁵⁸ link the taste of ashes with the previous presence of a

⁵⁵⁷ [Aristotle] *Problems* 22.8 makes a similar point, without explicit reference to the sun.

⁵⁵⁸ *Meteor.* 2.3 359b4-7; cf. *ibid.* 4.11 389b2, and D.E. Eichholz, 'Aristotle's Theory of the Formation of Metals and Minerals', *Class. Quart.* 43 (1949) 145.

fiery element, and Theophrastus probably followed Aristotle (*On Sensation* 4 441b1-5) in attributing bitterness in water to its having flowed through ashes or substances with a similar effect; cf. **212**, from *On Waters*, and *CP* 6.3.1 where Theophrastus like Aristotle attributes this view to “the ancients”. Cf. also **221**.

In 17 συμμέτρως might better be translated not by “of moderately loose texture” but by “of suitably loose texture”—i.e. of a texture proportioned to the task in hand. συμμέτρως here naturally goes with ῥηθῆται “is strained” rather than with ἀραιῶν “of loose texture”,⁵⁵⁹ but the relevant aspect of the way in which the straining takes place is presumably indeed the nature of the substance through which the wet ash is strained.

- 427** Galen, *On the Composition and Powers of Simple Drugs* 4.14 (vol. 11 p. 664.4-665.4 Kühn)

Rose (1863) p. 227 no. 10 (203). Regenbogen (1940) 1442. G.R. Thompson (1941) 253 n. 100. Sharples (1985) 192. Einarson-Link (1976-90) vol. 2 463.

Galen cites Theophrastus and Aristotle for the view that wine that is naturally warm is matured more quickly by heat, while that which is colder and more watery is harmed. He uses this as an analogy for the view that exercise makes human bodies which are already warm and robust stronger, but harms those which are not. Theophrastus does not make this point in *CP* 6, and in fact says rather that the heat of the sun brings immature plant juices to maturity but causes those already ripe to deteriorate (*CP* 6.15.3). Regenbogen and Einarson-Link derive our present passage from *On Wine and Olive-Oil*, though the former also mentions *On Flavours* as a possibility.

Thompson (1941) 254 notes that for Theophrastus external heat can sometimes aid internal heat, citing *CP* 4.16.3 where warm water can help old worm-eaten cereal to germinate, and sees in this a more empirical approach contrasting with the more abstract and theoretical treatment in *Meteor.* 4.1, where external heat is mentioned simply as destroying innate heat, its doing so indeed providing the definition of decay (*Meteor.* 4.1 379a17; cf. Theophrastus *On Odours* 40).

In line 15 Nutton (1992) points out that to retain *thermotêtos* and

⁵⁵⁹ I am grateful to Vivian Nutton for pointing this out.

delete *othneiâi* is preferable, avoiding hiatus; the sense will then be just “by excess either of heat or of cold”.

- 428** Plutarch, *Table-Talk* 5.3.1 676AB (*BT* vol. 4 p. 157.13-22 Hubert) Sharples (1985) 192.

Theophrastus is cited for the explanation of the fact that vines from places where pine-trees grow produce sweet wine; he is reported as saying that this is because pine-trees like clay soil, and clay soil is warm and assists in concocting the wine (for external heat doing this see above, on **427**). This does not occur in the extant text of Theophrastus. The parallel observation in Plutarch, that clay soil mixed with grain already harvested ripens and distends it, does occur at *CP* 4.13.7, where it is taken as evidence that the grains can absorb food to some extent even when separated from their roots. Very probably Theophrastus cited the example again in *On Wine and Olive-Oil*, using it to support his point about the effect of clay soil on wine.

- 429** Galen, *On the Composition and Powers of Simple Drugs* 2.5 (vol. 11 p. 474.8-18 Kühn) Rose (1863) p. 229 no. 12 (205).

Archidamus⁵⁶⁰ (late 5th century) was the father of Diocles of Carystus, and had held that oil should not be used in massage because of its drying effect on the skin; Diocles reported and modified this view in a work named after his father.⁵⁶¹ Galen reports Archidamus' view from Diocles' work, and then in our passage criticises him for concentrating on the apparent effect rather than the underlying cause; the drying effect of boiling in olive oil was the sort of problem Aristotle and Theophrastus investigated more systematically. There is no exact parallel to this in the extant text of either Aristotle or Theophrastus: Aristotle *Meteor.* 4.2 381a8 notes that olive oil will not boil by itself, and 4.7 383b22ff. that it is itself thickened by both cold and heat. The presence of *pneuma* in oil is discussed at Aristotle *GA* 2.2. 735b13ff. Theophrastus might have discussed this topic in *On Wine and Olive-Oil* (**384** no. 2f) but the report could equally well—if

⁵⁶⁰ no. 11 in *RE* suppl.1 (1903) 119 Wellmann.

⁵⁶¹ Galen, *simpl. med.* 2.5 (vol. 11 p. 471.14ff. Kühn) = Diocles fr. 147 Wellmann; cf. Jaeger (1938) 59-62.

Galen has a specific text in mind at all—derive from *On Solidifying and Melting* (137 no. 14) or from another work on physics. The reference could however be to discussion of problems concerning physical change in general, rather than to a treatment by Theophrastus of this particular issue.⁵⁶²

ODOURS

430-434 Stratton 36-42. Gottschalk (1967) 25f. Sharples (1985) 193-7. Sedley (1985) 205-7.

Theophrastus' doctrine concerning odours and the sense of smell is preserved for us in *CP* 6.14-20, in the treatise *On Odours* (= 384 no. 2g), and in a number of secondary reports (cf. 277). A major difficulty is that of deciding whether Theophrastus, like Aristotle, holds that we are aware of odour through change in an intervening medium (which may be either air or water), or whether, as some passages seem to indicate, he regards it as due to a material efflux of particles. It is actually to him, rather than to Aristotle, that the coinage of a term for the intervening medium, *diosmos* or "transodorant", is attributed.⁵⁶³ Sedley however remarks ([1985] 207 n. 4) that Theophrastus could have coined *diosmos* in the context of discussion of an Aristotelian theory that he does not himself hold.

At *CP* 6.17.1 Theophrastus suggests that the reason certain flowers like violets smell more fragrant at a distance is that something from the other parts of the plant is carried along with the odour at first, but is too thick and earthy to reach a long distance.⁵⁶⁴ This passage *might* be understood in terms of affections of the medium that make it more "earthy" or heavy,⁵⁶⁵ or in terms of the smell itself being an affection of a medium while the accompanying earthy particles form a material effluence; but these are not the most natural ways in which

⁵⁶² I am grateful to Vivian Nutton for pointing this out.

⁵⁶³ See 277C. Aristotle had noted that it had no name; *On the Soul* 2.7 419a32-b2).

⁵⁶⁴ Cf. Hieronymus of Rhodes fr. 53 Wehrli = Plutarch *Table Talk* 1.8 626a, and [Aristotle] *Problems* 12.2, 12.4, 12.9; Marengi (1991) 16. Aristotle himself allows that odour and sound, unlike light, take time to travel, even though they are not themselves in his view bodies (*On Sensation* 6 446a20-b27).

⁵⁶⁵ Cf., perhaps, with Stratton (1917) 38 n. 10, *On Odours* 39, where certain perfumes are described as "more bodily", *sômatôdestera*).

to read it. At *CP* 6.14.11 Theophrastus refers to old and dried flowers as lacking fragrance because they do not give off an exhalation (*anapnoê*); and at *On the Senses* 90 he is prepared to say, in arguing against Plato, that it is *agreed* that smell is an effluence (*aporrhoê*) and breathing in (*anapneusis*) of air, while criticising Plato for likening it to smoke and mist. Similarly at *On Odours* 3 he says that odour involves inhalation (*anapnoê*: Stratton [1917] 39). At *On the Senses* 20 he objects to Empedocles' theory of effluences, but the objection seems to be, as Sedley argues, not to the involvement of a material effluence *at all*, but to its being from all four elements and such as to involve perceptible diminution of bulk in the fragrant thing.

At *On the Senses* 21-22, indeed, Theophrastus argues against Empedocles' identification of smell with respiration simply, pointing out that some creatures have a sense of smell without breathing at all. But the question whether breathing is required for a sense of smell and the question whether it is to be explained in terms of effluences are distinct.⁵⁶⁶ Breathing serves, in those creatures where it occurs, to put the odour in contact with the sense-organ, as **277B** 34-7 and Aristotle *On the Soul* 2.9 422a1 ff. indicate;⁵⁶⁷ it is therefore natural enough for Theophrastus in *On the Senses* 90 and *On Odours* 3 to speak loosely as if smelling and breathing were the same thing in those creatures, like ourselves, in which the former cannot take place without the latter. This seems a more plausible explanation than that Theophrastus in *On the Senses* 21-2 has been led into inconsistency by his desire to attack Empedocles, as Stratton 40 argues.

As for the question whether what comes into contact with the sense-organ is a material effluence or a medium that has undergone some change, it may be that Theophrastus did not distinguish sharply between these two possibilities. In *CP* 6.1.1 he says in the case of flavour that there may be no distinction between mixture of the dry and the moist, on the one hand, and the infusion of the dry in a moist medium on the other; and he appears to apply this to odour too, explained in similar terms but with the transparent, qua *diosmos*, substituted for the moist (since air and water are the media through which smelling can occur).⁵⁶⁸ Odour is described as the result of a

⁵⁶⁶ I am grateful to David Sedley for pointing this out.

⁵⁶⁷ Cf. also Aristotle *On Sensation* 5 443a2-8 and 444b7-13.

⁵⁶⁸ Similarly Aristotle, *On Sensation* 5 447b27-443a2; cf. Einarson-Link (1976-90) vol. 3 202-3, and on taste, above n. 541.

mixture and affection of the air, according to Theophrastus, in **277A**. Even Aristotle, in explaining how fish can smell in water, refers to odour as the nature of the sapid dry *in* what is moist (*On Sensation* 443a3-8).

Gottschalk sees the presence of two views in Theophrastus, an effluence theory and a more Aristotelian theory of the modification of a medium, as symptomatic of a general tension in his writings between general theory and the discussion of particular phenomena. Sedley, on the other hand, regards Theophrastus as deliberately rejecting the Aristotelian theory in favour of an effluence theory, which is after all, as he says, the correct one. The truth may be that Theophrastus did not distinguish clearly between the Aristotelian theory and an effluence theory which he understood in terms of the movement of affected air. Philoponus explicitly adopted a "two-stage" theory, in which corporeal effluences act upon the medium,⁵⁶⁹ and Sorabji (1991) argues that such a theory may be the explanation for the conflicting testimony concerning Theophrastus. Priscian of Lydia, *Paraphrase of Theophrastus' Discourse On the Soul* 1.28 (p. 13.18-19 Bywater), in a passage that may reflect Theophrastus, speaks in the same context both of particles and of an effect on the air;⁵⁷⁰ and Strato (fr. 113 Wehrli) explained sight by an efflux of material particles, but held that they colour the intervening air.⁵⁷¹

430 (report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 2.3 (vol. 11 p. 467.1-11 Kühn)

Galen is here criticising over-simplified correlations; he first attacks those who suppose that, because all fire is reddish in colour, everything reddish in colour is fiery or hot, and then proceeds to attack the simple correlation of fragrance and heat, citing Aristotle and Theophrastus in support of a more subtle view. The report of Theophrastus' views is accurate; not just heat but appropriate heat is required (cf. especially *CP* 6.17.5, and 6.18 on why all plants are not more fragrant in hot countries). For Galen's characteristic polemical insistence

⁵⁶⁹ Philoponus *On Aristotle's On the Soul* 392.8-19, 413.11; noted by Sorabji (1991) at 234 and n. 45.

⁵⁷⁰ I am grateful to Pamela Huby for this reference. See the Commentary on **277**.

⁵⁷¹ To this Wehrli (1967-78 vol. 5 p. 75) compares Democritus' theory of vision. The two theories of smell, that of material effluence and that of effect on a medium, are presented as alternatives by Anonymus Londinensis XXX 44ff. (*Suppl. Arist.* vol. 3.1 p. 57 Diels).

on the need for distinctions, combined in this context—as often—with criticism of others for ignorance of logic, see **128-130**, **336** and **418** and the commentaries there.

- 431** (report of extant Theophrastean work) Galen, *On the Composition and Powers of Simple Drugs* 4.22 (vol. 11 p. 697.15-698.4 Kühn)

Stratton (1917) 42. Sharples (1985) 196 and 204 n. 151.

Galen observes that pleasant taste and fragrance do not go together, though fragrance and actual bitterness are never found together either, and said that Theophrastus enquired into the reason for the discrepancy. The fact that sweet or pleasant taste and fragrance do not go together is one that Theophrastus notes in a number of places;⁵⁷² at *On Odours* 5 the fact is stated but not the explanation, while *CP* 6.9.4 promises a later discussion. So too does *CP* 6.14.5, commenting that the sweet flavour is earthy whereas odour belongs to what is thinner and drier. The fullest discussion is in *CP* 6.16.1-8, where fragrance is linked with a first concoction and sweet taste with a second, the context being the specific question of why wild fruits (which do not complete the second concoction) have more fragrance but less sweetness than do cultivated ones. Theophrastus extends his discussion to the bitterness of fragrant plants in general at *CP* 6.16.7. Our text might thus have been included in **417** as a parallel to *CP* 6.16.1-8; but it has been printed out in full because of the complexity of its relation to the Theophrastean text.

Galen's own explanation in the sequel is in terms of sweetness being due to suitability to the tongue, fragrance to suitability to the cavities in the brain into which he believes vapour is drawn and where smelling takes place. The same things will not, he argues, necessarily be suited to both; in the case of a rose taste can detect the earthy sour element and the hot bitter one as well as the watery, but it is the watery alone which, being heated and given off as vapour, produces the fragrant smell. On Galen's theory in general cf. Eastwood.

⁵⁷² Cf. Aristotle, *On the Soul* 2.9 421a26ff.; cf. also Sextus Empiricus, *Outlines of Pyrrhonism* 1.92.

- 432** (dubious report concerning Theophrastus) Galen, *On the Composition and Powers of Simple Drugs* 3.16 (vol. 11 p. 593.11-594.2 Kühn)

Sharples (1985) 197.

Galen distinguishes two types of mixture, that which is complete and that which involves the juxtaposition of imperceptibly small particles. He then observes that considerations put forward by himself and by Theophrastus show that rose-perfume is an example of the second type. Galen does not actually say that Theophrastus himself interprets rose-perfume in this way, only that a study of the subject, using Theophrastus' writings and Galen's own, will lead one to this conclusion.

Galen goes on to refer to the power of penetration of rose-perfume. At *On Odours* 45 Theophrastus describes rose-perfume as obscuring other odours because of its lightness, which causes it to fill up the passage leading to the organ of smell; but this seems to be a distinct point in Galen's discussion from that for which he cites Theophrastus, and the source in Theophrastus of Galen's report here is unknown. Galen himself emphasises the cooling effect of the smell of roses.⁵⁷³

- 433** (dubious report concerning Theophrastus) pseudo-Plato, *Book of Tetralogies*, The Second Tetralogy (p. 139.14-15 Badawī)⁵⁷⁴

For references and literature see Manfred Ullmann, *Die Natur- und Geheimwissenschaften im Islam*, Leiden: Brill, 1972, 155 and Fuat Sezgin, *Geschichte des arabischen Schrifttums*, vol. 4, Leiden: Brill, 1971, 98. The Arabic text of the *Book of Tetralogies* (*Kitāb ar-rawābi'*) was edited by Abd-ar-Rahman Badāwī, *al-Aflātūniya al-muḥdaṭa 'inda l-'Arab / Neoplatonici apud Arabes* [Dirāsāt Islāmiya / Islamica 19], Cairo 1955 (repr. Kuwait 1977), 117-239, with an introduction, (42)-(46). Cf. also the brief review notice by Richard Walzer in *Oriens* 10 (1957) 394-5. Daiber (1985) 109-110.

The *Book of Tetralogies* (*Kitāb ar-rawābi'*; translated as *Liber quattorum* in medieval Latin) is an alchemical treatise in the form of a dialogue between a certain Ahmad ibn al-Ḥusayn ibn-Ḡahār Buḥtār and the famous translator Ṭābit ibn-Qurra (died 901). After an introductory

⁵⁷³ Galen, *On the organ of smell* 4.8, *CMG* suppl. vol. 5 p. 48.1-4 Kollesch; *ibid.* 6.5, p. 62.5-12 Kollesch. Cf. Eastwood (1981) 284, 288.

⁵⁷⁴ The commentary on this text is by Dimitri Gutas, to whom I am most grateful for it.

conversation between the two, Ahmad proceeds to cite another Platonic pseudepigraph, the Arabic original of the Latin *Summa Platonis*, and to comment on it sentence by sentence.

The context in which the quotation ascribed to Theophrastus occurs is the following (pp. 138.13-139.18 Badawī). Ps.-Plato defines the pure as that which has a single essence, and the turbid as that which is composed of dissimilar parts. Evil smells and filth are the result of dissimilarity in the constituent parts of the body in which they appear. Evil smells, however, may also be produced during the initial stages of a process of rarefaction (*wa-qad yakūnu n-natru aydan min muqaddimāti t-talīfi*). Excrement, for example, is a product of such a process, namely of digestion, whereby the food is refined and rarefied for the extraction of the simple and fine essences (*laṭā'if*). For this reason pseudo-Plato warns his reader not to charge him with making contradictory statements except after deep reflection on his, the reader's, part. Ahmad then presents the following commentary on this statement:

'Whoever is unaware of what the philosopher [pseudo-Plato] says, of his meaning, and of his purpose in every statement, imagines that the philosopher's statements are self-contradictory and at variance with each other. Such is what has just preceded in these sections. For at the beginning of the discussion he [pseudo-Plato] stated that bad smells are an indication of turbidity, while later he also included them in the process of rarefaction. He is, however, right in both statements, for in each he maintains a true concept. As a matter of fact, Theophrastus said in one of his essays that bad smells fall down as a result of density and rise up as a result of rarity. So Plato means that one should not hasten to criticise his statement and call it false, because it contains abstruse but true concepts; and whoever finds fault with it does so only because of his deficient knowledge and awareness. He [pseudo-Plato] said, "except after deep reflection", because only after deep reflection [on the part of the would-be critic] is he secure from being found fault with, since he is free of faults.'

If the statement attributed to Theophrastus is understood in this context, then it would mean that Theophrastus believed that bad smells fall down not because they themselves are dense (as implied by Daiber's translation in his [1985] 109) but because they are produced by dense and turbid, i.e. compound, substances; and conversely, that they rise up not because they are rare and fine, but because they are the product of a process of rarefaction.

This is the interpretation suggested by the context in the alchemical *Book of Tetralogies*; but it is far from certain, first, that this quotation accurately reflects the Arabic text from which it was copied; second, that this Arabic text reflects a Greek original; and third, that this Greek original was attributed to Theophrastus. Too little research has been conducted on the *Kitāb ar-Rawābī* to permit an estimation of the validity of the eponymous quotations it contains. The only argument that supports the assumption of the authenticity of the Theophrastean quotation is that of *lectio difficilior*. The name of Theophrastus was not particularly current in Graeco-Arabic alchemy, and its presence in this text would suggest that it was copied from the source. Beyond this not much can be maintained at present.

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434 Passages in Theophrastus' work *On Odours* to which later authors refer mentioning Theophrastus by name

1 *On Odours* 14-15] Athenaeus, 2.74 67B.

At *On Odours* 15 Theophrastus says that perfume-makers use almond oil because it is not greasy, and that where olive oil is concerned they use "raw-pressed" oil from unripe olives for the same reason. In Athenaeus this becomes a statement, explicitly attributed to Theophrastus in *On Odours*, that "raw-pressed" olive-oil is made from unripe olives *and* almonds. Possibly the blame here may lie with the epitomator of Athenaeus, rather than with Athenaeus himself.

3 *On Odours* 29-30] Photius s.v. *megalleion muron*

On *megaleion* perfume (so spelled), and its medicinal properties discussed by Theophrastus at *On Odours* §35, see Scarborough (1978) 383.

HONEY

435 Photius, *Library* 278 529b11-23 (*CB* vol. 8 p. 169.25-170.9 Henry)

Joachim (1892) 15. Dirlmeier (1937) 80-1. Regenbogen (1940) 1423. Pembroke (1971) 134-5. Sollenberger (1988) 20. Magnaldi (1991) 36 and n. 12, and refs. there.

On Types of Honey, or in Diogenes Laertius' list simply *On Honey*, is **384** no. 5 above. On the general character of Photius' summaries of Theophrastean works see above on **345**. Here Photius distinguishes three ways in which honey is produced; (i) in flowers, (ii) from concocted moisture falling from the air (for which, with reference to the oak-tree, cf. also *HP* 3.7.6), and (iii) in "reeds". He then returns to (ii) and says that the honey from the air is found above all on the leaves of oak-trees and lime-trees, because these have a suitable texture to retain it without absorbing it; and finally adds that "the bee has a certain affinity (*oikeiôsis*) to the oak-tree". The relevance of the last statement is not made clear, but it is presumably that bees collect honey of type (ii) from the leaves on which it collects. Seneca, *Letters on Morals* 84.4-5 says it is uncertain whether honey is made by bees or collected by them; he too refers to honey in reeds, in *India*, and Summers interprets this as a reference to sugar-cane, *Saccharum* L.⁵⁷⁵

The reference to the affinity between bee and oak-tree has been much discussed in connection with the alleged origin in Theophrastus of the Stoic concept of *oikeiôsis*; for it is that word that occurs here, whereas **531** below speaks rather of *oikeiôtês*. Dirlmeier ([1937] 80-1) saw the present passage as evidence for the Theophrastean origin of the concept, but its relevance has generally and rightly been doubted.⁵⁷⁶ The idea of "sympathy" noted by Röhr (1923) 58 in **365A** and elsewhere is different, concerned with different things being affected in similar ways rather than with one thing having an affinity for another. See above, n. 307.

It is likely that the Theophrastean work *On Honey* is reflected also in *Mirabilia* 16-22 and Pliny 11.30-45.⁵⁷⁷ *Mirabilia* 16-22 includes a number of observations about various types of honey, with particular attention to their physical consistency and scent, each observation—characteristically for the work—being introduced by a geographical reference (see above, n. 160). Honey from Trapezus is said (18) to madden healthy men but cure epileptics.⁵⁷⁸ There follow a reference

⁵⁷⁵ W.C. Summers, *Select Letters of Seneca*, London: Macmillan, 1910, p. 286 ad loc., comparing Eratosthenes ap. Strabo 15.1.20, and Pliny 12.32.

⁵⁷⁶ M. Pohlenz, 'Grundfragen der stoischen Philosophie', *Abh. Göttingen*, phil.-hist. Kl. 3.26 (1940) 12 n. 1; C.O. Brink, '*Oikeiôsis* and *Oikeiôtês*', Theophrastus and Zeno on Nature in moral theory', *Phronesis* 1 (1956) 123-45, at 140 n. 98. Cf. also Pembroke (1971) 134-5; Magnaldi (1991) 36 and n. 12, and references there.

⁵⁷⁷ Rose (1863) 280; Joachim (1892) 15; Regenbogen (1940) 1423; Flashar (1972) 40, 77-9; Sollenberger (1988) 20.

⁵⁷⁸ For such effects cf. Pliny 21.74.

(21) to the antipathy of bees to myrrh, and a description (22) of the making of mead among the Illyrians, with the comment that it was once also made in Greece but the recipe was lost.⁵⁷⁹ Pliny 11.30-45 lists three types of honey, but the types are different from those in **435**, Pliny's being classified by the seasons ("flower-honey" in the spring, "summer honey", and "wild honey" or "heath-honey" in the autumn),⁵⁸⁰ Theophrastus' by the method of production.⁵⁸¹

⁵⁷⁹ Sollenberger (1988) 20 and n. 29 notes the possible connection here with discussion of wine. *Mirabilia* 17-19 are repeated at Aelian 5.42.

⁵⁸⁰ Cf. M. Schuster, art. "mel", *RE* 15.1 (1931) 364-384, at 370f.

⁵⁸¹ Regenbogen (1940) 1423 proposed reading *kai to meli* for *kai to men* at Theophrastus *CP* 6.7.7 (not 6.8.7 as he says), but this is implausible. The *Official Catalogue of the Great Exhibition of 1851* vol. 3 p. 1402, which Pamela Huby has drawn to my attention, attributes to Theophrastus and Dioscorides the statement that the best honey is from Attica, especially Hymettus, and from Carystus, the latter being rose-honey. There is a reference to honey from Hymettus at Dioscorides 2.82.1 (t.1 p. 165.16 Wellmann), and Wellmann cites our text in his apparatus, along with Pliny 11.32, Oribasius 1.63.1 (from Rufus), and *Geoponica* 15.7. None of these mention Carystus. It may be that a similar cross-reference in some earlier edition led someone to assume that Theophrastus was being cited for specific details when the reference was in fact more general. Rose-honey is discussed, but in general terms without reference to particular places, at Dioscorides 5.27, Oribasius 5.17.5 and 5.25.27, and Aëtius Amidenus 3.104. Honey and *rose-perfume* are mentioned together at Pliny 22.108 as placed in the ears to kill parasites.

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[See also the list of abbreviations on p. xv]

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INDICES TO THE TEXTS

PRINCIPAL TERMS: GREEK

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- ἀκατάσχετος uncontrollable **362C.10**
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- διαφορά difference, different type, distinction, differentiation **331A.6, 336C.10, 350.4, 365B.5, 371.3, 418.6.8.9.10**
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 Περὶ ζῳων ιστορίαι (*Researches concerning Animals*) by Aristotle **389.4**
 Περὶ (ζῳων) κινήσεως (*On the Motion of Animals*) by Aristotle **389.5**
 Περὶ (ζῳων) μορίων (*On the Parts of Animals*) by Aristotle **389.5**
 Ἡρώς (*Hero*) by Diphilus **406.4**
 Θηριακά (*On Antidotes*) by Nicander **360.2**
 Κωφοὶ Σατύροι (*Dumb Satyrs*) by Sophocles **374.4**
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 Περὶ ὕπνου *On Sleep* by Aristotle (?) **389.5**

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- Phisica** (*Physics*) by Albert the Great **376B.3**
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PERSONS AND PLACES REFERRED TO IN THE TEXTS

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